THE IRON AGE

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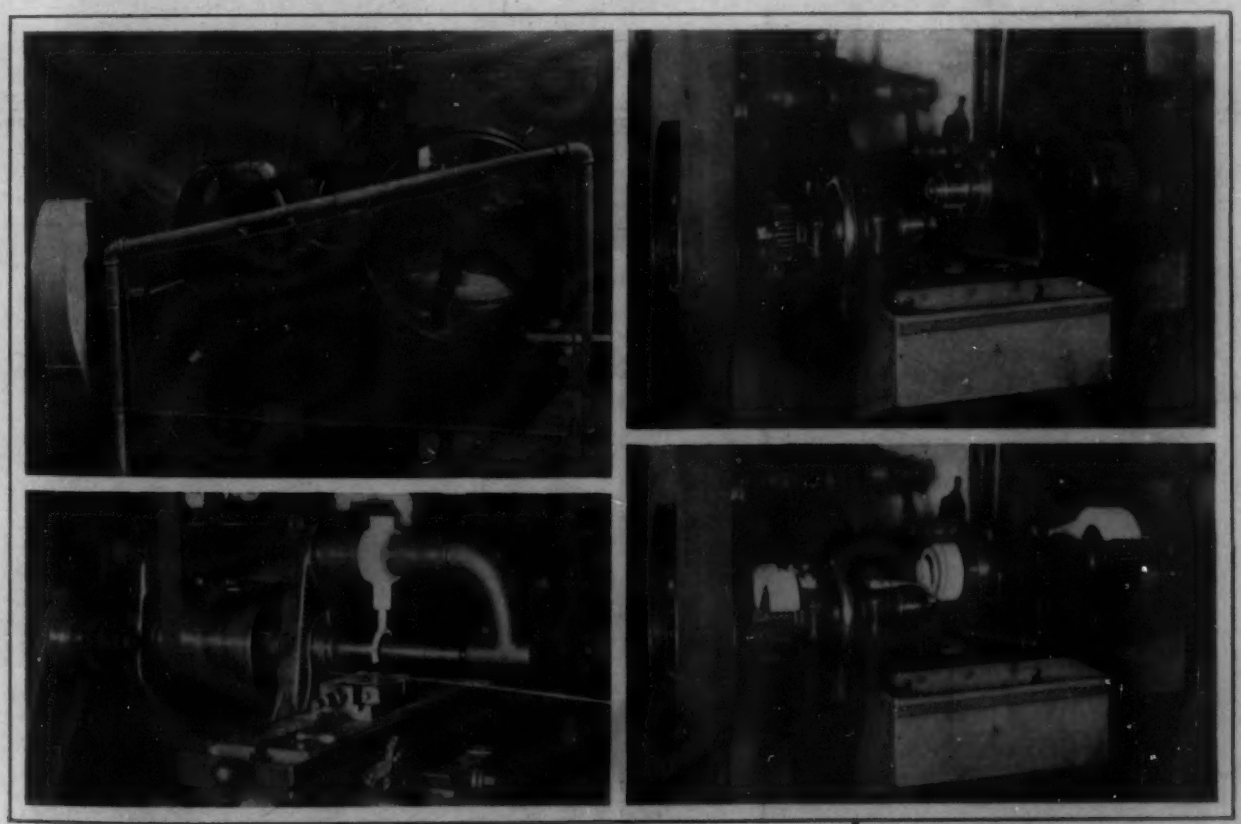
Safeguards in the Eastman Kodak Works

Methods and Appliances Adopted in the Eastman Photographic Materials Factories in Rochester, N. Y.—A Works Committee of Safety

In keeping with its policy of conserving the health and safety of its employees, the Eastman Kodak Company, Rochester, N. Y., not only has provided numerous safety devices on both wood and metal working machines in the operation of which dangers are encountered, likewise enclosing belts and other moving parts, but has caused a committee of safety, organized for the purpose, to make a continuous study of conditions as they exist in the shops and also a study of accidents, of methods to avert accidents in the first place and of means to prevent their repetition. The committee of safety consists of the managers of the five Rochester factories of the big photographic manufacturing company, and it investigates and furthers the adoption of all practicable safety appliances in all of the various factories of the company. The committee meets monthly and studies carefully all accidents which occurred in the preceding month. Its members offer any ideas or suggestions they may have conceived or which have been originated by others, and these are discussed, then tried out, and if found practical, are adopted. In the various factories there are sub-committees whose duty it is to call to the attention of the management any machinery, apparatus or equipment that is not in safe condition or which is for any reason a menace to the operatives. The recommendations of the sub-committee are considered, and if found worthy, the necessary safeguards are installed.

Accidents occurring in the Eastman factories are tabulated, together with the related data. The compilations show the number of employees in each factory, the number and character of mishaps, the value of the time lost by the employee and the compensation paid by the company. The accidents also are classified as to cause. In connection with compensation paid by the company after the occurrence of an accident, it may be said that the payments are made on a basis which is growing more and more uniform, although each case is still dealt with on its own merits. The company has set aside a fund of



Gear Hobbing Machine with Safety Guard and Casing
Hand Milling Machine with Safety Guard
Thread Rolling Machine without Safety Guard
Thread Rolling Machine with Gears and Rolls Safeguarded

EXAMPLES OF MACHINE SAFETY GUARDS IN WORKS OF EASTMAN KODAK COMPANY, ROCHESTER, N. Y.

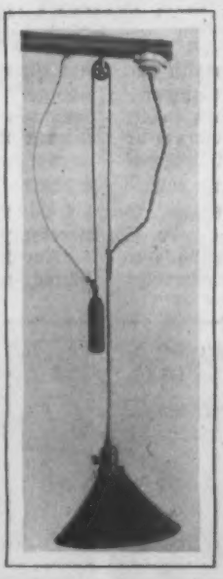
Guard for Buzz Saw

Guard Over Buzz Planer Knife

$1,000,000, the income of which is being used in taking care of its sick and injured employees and those old in the service.

The number of accidents in the five Rochester factories per 100 employees during 1911 was 30 per cent. lower than in 1910, and the reduction is credited to the constant study of conditions and the resultant steps which have been taken to prevent accidents by means of safety devices as well as to an effort which is made constantly to stimulate in each employee a greater interest in his own and his fellow employees' safety. At two of the company's largest factories, emergency hospitals are maintained and full medical attention is provided in each case of injury.

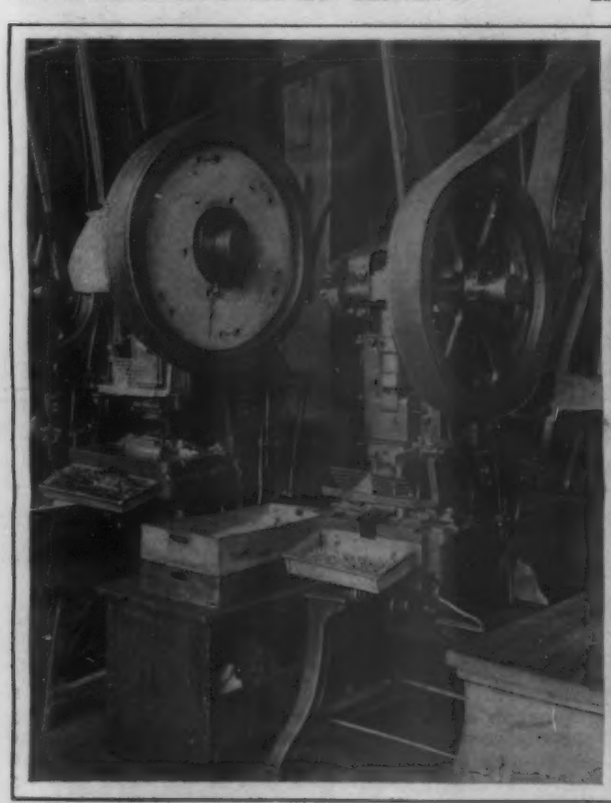
In the accompanying illustrations are shown a number, but by no means all, of the safety appliances in use in the Rochester factories. Those used on the punch presses and buzz planers are manufactured by the Jones Safety Device Mfg. Company, Buffalo, N. Y., but all the others were designed by the mechanical experts of the Eastman Kodak Company. It is a notable fact that some of its keenest minds have turned their attention to the work. None of the safety appliances devised by the company has been patented, and this fact, as well as the details of construction, is freely explained to visitors to the plant. Some of them are considered to be as near fool-proof as it is possible for a mechanical contrivance to be.



Safety Counterweighted Lamp

As in the case of other manufacturers, when safety appliances were first installed, opposition was met with from some of the workmen, who maintained that the safety provisions were "in the way," that they impeded their work and were unnecessary with careful men of their kind. W. F. Folmer, manager of the Folmer & Schwing division of the company, relates an anecdote of one testy but thoroughly competent old sawyer who had been with the company for many years. He threatened to quit if the company continued to attempt to protect his hands and fingers. After an accident to another workman, however, the old journeyman said less against the device in question and finally, after becoming used to it, he announced that he would quit if it were taken off his machine.

Among the machines or moving parts on

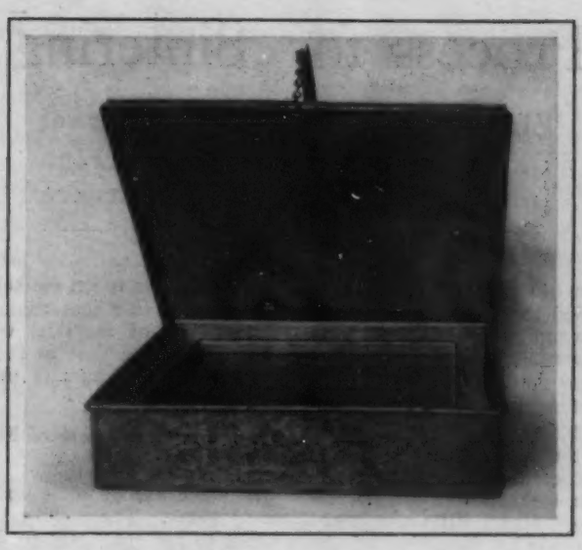


Punch Presses Showing Safety Guard in Two Positions, Also Flywheel Guarded and Not Guarded

Automatic Press with Wire Mesh Guard for Gears and Plate Guard for Other Moving Parts

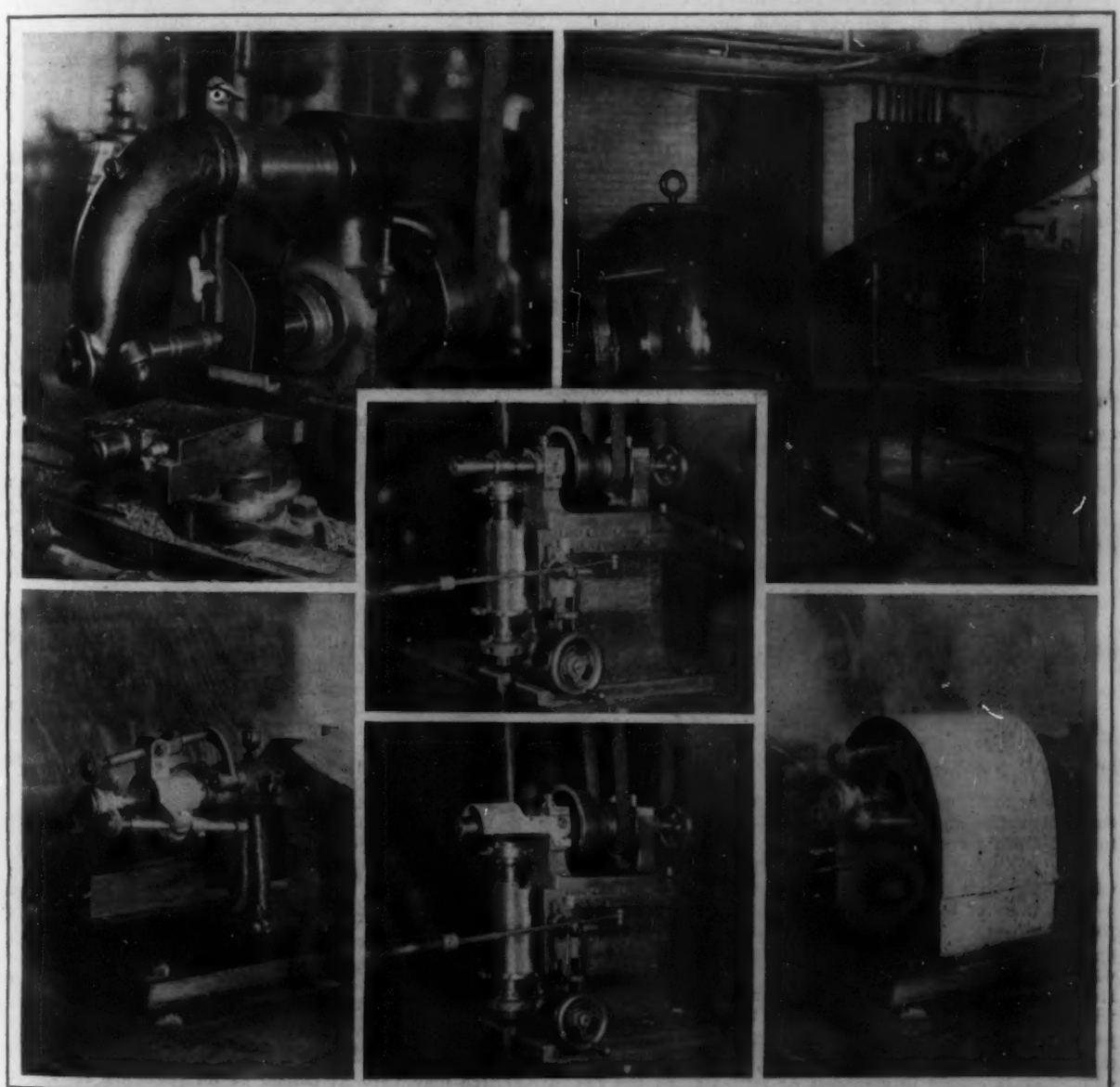
which devices preventive of accident have been placed are band and buzz saws, mortising machines, gears, flywheels and belts generally, lathes, milling machines, presses, gear hobbing machines, thread-rolling machines, bottle-capping machines, gasoline box tanks, freight elevators and incandescent lamp counterweights.

An assurance against accident in all the factories of the company is the abundance of light from many large windows, while due care has been taken of ventilation, all of which tends to maintain prime physical condition and wakefulness on the part of employees. Cleanliness, which is an essential in photography, starts in the large group of Eastman factory buildings.



Pan for Gasoline and Other Inflammable Liquids; Drop Lid Operated by Fusible Link

In conjunction with the precautions against accident in the Eastman factories may be mentioned the facilities which exist for protection against fire in Kodak Park, Rochester, which comprises about 72 acres and contains over 70 buildings, affording floor space of nearly 40 acres, and housing about 3200 men and women employees. While the buildings are mostly of fireproof construction, the plant has been amply provided with fire-fighting equipment, including 2¼ miles of water mains for that purpose, with 37 hydrants, 4500 ft. of hose, 16 hose houses and an organized fire department of 89 members having regular weekly drills. There also are volunteer fire companies in the departments, whose duty it is to see that employees are drilled to leave the buildings promptly and in order in case of fire. The buildings are equipped with sprinklers.



Milling Machine with Safety Guard

Belt Safeguarded by Rail and on Intake Side by Screens

Bottle Capping Machine without Safety Guard

Bench Milling Machine without Safety Guard

Bench Milling Machine with Safety Guard

Bottle Capping Machine with Safety Guard

SAFEGUARDS IN THE EASTMAN KODAK WORKS, ROCHESTER, N. Y.

The West Process for Sintering Flue Dust

Elaborate Tests Showing Results of Different Methods of Preparing Fine Iron Ores for the Blast Furnace

BY JAMES G. WEST.*

Before the days of Mesaba ore discoveries the blast furnace people were not troubled to any extent with the blowing over from the furnace top of quantities of very fine particles of iron-bearing materials, or flue dust. They had a comparatively loose, easy burden to work. The hard high-iron ores of 20 or more years ago gave them very little trouble in regard to this loss, now becoming greater as the percentage of the Mesaba ores increases in furnace burdens. Data gathered over a good many years show that the Mesaba ores themselves are becoming finer in texture. In those days very little was heard regarding slips, or hanging, or sudden loosening of the hot mass of material in the furnace, causing large quantities of very fine dust to be thrown out with the issuing gases. We did not hear of clean gas for the hot blast stoves and boilers; high heats were easily obtained on the comparatively clean surface of the brick checker work.

In those operations the losses of iron ores charged into the furnace were not given very much thought, owing to their smallness. But the growing scarcity of these hard ores is compelling the use of more and more Mesaba ore until at present there are plants that are using all Mesaba in their burdens. To appreciate what this means to the furnace manager the following table of sieve tests shows how fine this mixture is becoming.

Group No. 1.

Per cent. remaining on sieve:								Through
	2	8	20	40	60	80	100	100
	27.50	26.69	15.19	10.72	4.81	3.19	1.84	10.06
	26.00	28.53	16.56	9.44	3.91	2.75	1.66	11.15
	31.22	25.09	14.12	9.06	3.69	2.47	1.44	12.91
Ave..	28.24	26.77	15.29	9.74	4.13	2.80	1.64	11.37

Group No. 2.

	25.87	20.87	9.27	9.92	8.24	4.27	2.84	18.72
	29.06	19.82	8.05	9.52	14.78	.95	1.16	16.66
	21.59	21.69	9.98	11.86	9.05	5.30	3.87	16.66
Ave..	25.50	20.76	9.10	10.43	10.69	3.50	2.62	17.34

Group No. 3.

	29.24	23.99	11.75	10.87	6.62	3.28	2.59	11.66
	29.53	28.26	12.96	7.69	6.17	1.56	2.80	11.03
	27.19	27.35	11.95	11.45	5.04	2.54	1.40	13.08
Ave..	28.65	26.53	12.22	10.00	5.94	2.46	2.26	11.92

Group No. 4.

	35.34	32.53	12.50	4.63	2.03	1.63	.84	10.50
	32.33	23.62	14.80	10.89	7.02	2.02	1.53	7.79
	34.44	22.40	14.78	9.85	5.43	2.09	1.90	9.11
Ave..	34.04	26.18	42.08	8.46	4.83	1.91	1.42	9.13

Group No. 5.

	25.58	23.77	12.24	12.05	9.03	3.03	2.00	13.30
	32.22	22.38	9.26	11.26	8.37	2.25	2.00	12.26
	23.88	22.97	12.34	11.38	8.00	3.84	3.28	14.31
Ave..	27.23	23.04	11.28	11.56	8.47	3.04	2.43	13.29

Besides the "group ores" there are a great many others that run just as fine, some as high as 24 per cent., through the 100-mesh sieve.

The gas pressures on a blast furnace top may vary within very wide limits. There are some plants that will average 7 to 11 in. of water; others may go as high as 30 in. of water. Combined with pressure we have the up-rushing gases coming out of the mass at the stock line with great velocity and meeting the down-falling stock from the bell. A great deal of the material above shown will be caught and carried along by the momentum imparted by the gases. This dust, a great deal of which is that passing through the 20-mesh sieve, as the tables above will show, is caught in receivers or settles along the gas flues. Some of the finest may be carried over to the hot blast stoves and boilers, depositing in these places and reducing the heat absorption of the apparatus. It is a difficult matter to get entirely rid of this dust in the gases, and it is a rule that as long as there is motion in the gases some of the dust will be carried along. To get rid of this fine dust in these gases there have been developed a large number of scrubbers, washers, cleaners, etc.

Production of Flue Dust Computed

To enable one to get an insight into this waste we will make use of some data extending over a period of eight years. These show that with blast furnaces using about 70 per cent. Mesaba ore and working under normal conditions, the dust is equal to 4 per cent. of the total materials charged. This includes ore, stone and coke. The average requirement of ore per ton of metal will be about 1.9 tons, that of coke 2240 lb., and of limestone 1000 lb. Using these figures, we will construct the following table, estimating the production of flue dust in the year 1911:

		Tons
Pig iron production of the furnaces using Mesaba ore	=	22,000,000
Tons ore used (22,000,000 × 1.9)	=	41,800,000
" stone (22,000,000 × 1000/2240)	=	9,821,000
" coke (22,000,000 × 1000/2240)	=	22,000,000
Total		73,621,000
Average production of dust, 4 per cent.	=	2,945,000

This can be placed at still a higher figure, for not over 90 per cent. of the total loss goes into the above percentage. Of the dust coming over with the gases, 85 per cent. is caught in the large gas receivers at the furnaces and this is the material which will be spoken of at all times in this paper.

Sieve tests of flue dust taken over a period of two years, all coarse coke being taken out before the test, showed the following:

Per cent. remaining on sieve:							Through
2	8	20	40	60	80	100	100
0.65	1.2	7.02	17.37	31.53	7.93	5.49	28.29

This test cannot be taken as a standard, because a great deal depends upon the regularity of the furnace operation, wind blown and nature of the ores used. Also some plants are screening the coke used, thus removing a large part of the breeze before the coke is charged into the furnace. Other plants are wetting their burdens very heavily. This also tends to reduce the quantity and also affects the quality of the dust. The softness of the coke used also has a great deal to do with the quantity produced, a soft coke increasing the amount to a very considerable extent. The figures below represent sieve tests of dust from a blast furnace that was rolling or slipping:

Per cent. remaining on sieve:							Through
2	8	20	40	60	80	100	100
24.60	6.60	10.60	13.62	15.08	6.17	4.10	19.23
19.03	2.83	11.70	17.86	20.17	5.18	3.58	14.95
12.79	.51	4.88	8.84	28.20	10.00	6.79	27.49

As a rule the part of the dust that passes through the 20-mesh sieve is the most valuable, containing most of the iron ore. That part remaining upon the 20-mesh sieve is mostly stone, coke and pieces of ore low in iron and rather high in silica. For future use it pays to screen the dust through the 20-mesh sieve, if it is to be treated to increase the size of the individual grains or masses.

Chemical Properties of Flue Dust

These may vary as widely as do the sieve tests, but the following table is a good illustration of the dust, taking off all material remaining upon a 20-mesh sieve and from a blast furnace using 75 per cent. Mesaba ore in the burden. All fine coke dust was screened out before charging the coke into the furnace.

*Assistant superintendent of blast furnaces, Edgar Thomson Works, Carnegie Steel Company.

Analysis of Flue Dust.

	SiO_2	Fe.	Mn.	P	Mois	Al_2O_3	CaO.	MgO.	Total C.	CO_2	S.
1	5.20	48.52	.39	.050	15.4	1.6	1.29	.30	4.71	.28	....
2	5.49	43.31	.43	.032	16.6	1.5	1.33	.31	8.41	.10	....
3	6.99	48.56	.43	.038	14.8	2.2	1.45	.09	4.68	.66	....
4	6.36	46.41	.46	.047	15.10	2.43	1.26	.48	3.67	.56	....
5	7.76	48.97	.38	.036	13.35	2.39	1.16	.42	3.73	.81	....
6	9.58	47.09	.31	.035	13.65	2.05	.99	.27	3.75	.83	....
7	9.23	46.60	.48	.034	14.15	2.18	1.67	.31	4.48	1.00	.10
8	8.26	46.69	.70	.037	16.10	2.25	1.30	.34	3.04	.70	.12
9	7.22	48.03	.44	.034	14.45	1.65	1.41	.25	2.57	.88	.10
10	9.46	47.16	.37	.036	14.80	1.97	.85	.28	2.50	.57	.07
11	9.23	46.43	.43	.034	11.80	2.07	1.37	.37	5.28	.83	.063
12	6.99	46.30	.47	.034	12.65	2.59	1.83	.45	7.41	1.60	.064

If a blast furnace is slipping or rolling heavily the total carbon in the dust may run up as high as 16 to 20 per cent. The carbon contents of the dust play an important part in the treatment, either by heat or by mechanical operations, which is employed to put it into various forms for recharging into the blast furnace. Most of the impurities, silica, etc., are combined mechanically with the iron; separation by screening does not produce any great degree of concentration. This also applies to the flue coke dust, the percentage remaining very nearly the same in all sieves under 20 mesh.

Physical Properties—A Poor Heat Conductor

The structure is mostly in the form of grains that seem to allow large quantities of air or water to be absorbed by any mass into which it may be shaped. It will hold approximately 25 per cent. of water by weight without separation. It approaches sand in its resistance to compression, remaining granular after subjection to enormous pressures. Experiments have been made where 25,000 lb. per sq. in. has been used and upon taking from the mold, the heavy pressure having caused cast iron to be disturbed or swelled out, the dust mass itself would crumble easily under the touch. Any slight fall would shatter it into small pieces. It is a very poor conductor of heat; a very slight layer will act as an insulator.

Fig. 1 illustrates this non-conducting power of the particles. As may be noticed the rate of fusion does not exceed 1 in. an hour, and if the gases do not come in contact with all surfaces of the mass the unexposed surface will not be heated thoroughly. (Notice the bottom of all the masses.) The heat penetration or conduction may be increased in both rapidity and extent by subjecting the mass to a high degree of pressure before application of the heat. This is explained by the fact that pressure excludes the contained air and brings the particles of the ore closer together and in this condition they conduct heat more rapidly.

Experiments make it self-evident that all particles of the material in masses must be subjected to the same degree of heat if the melting mass is to be uniformly cemented together. We cannot depend upon conduction to aid to any quick operation.

Cementation starts very close to 2300 deg. F. Any temperature below this point only serves to change some of the other physical properties of the dust. Temperatures above this produce close fusion or liquefaction. The degree of latitude between semi-fusion and liquefaction is very slight. This is aggravated to a considerable extent if carbon be present. If too much carbon is present it tends to retard the fusion, until it is consumed by the heat; and if the mass is withdrawn before the coke or carbon is consumed, there will be no fusion of the ore particles, the resulting mass being very grainy in structure.

Magnetic Properties

The magnetic properties vary a great deal in the different kinds of dust and depend on the temperature of the furnace top from which they were produced. About 60 per cent. of the total iron, as shown in the chemical analyses in the foregoing tables, will be magnetic. By exposing to heat at varying temperatures it has been demonstrated by repeated tests that this percentage may be raised.

Table Showing Per Cent of Magnetic Material in Flue Dust at Varying Degrees of Heat.

	Temp.	SiO_2	Fe	Al_2O_3	CaO	MgO	Ign. Loss	Carbon	Per ct. Orig. sample
Mag.....	75 deg. F.	4.04	63.65	2.81	.20	.10	None	1.80	68.80
Non-Mag.		11.26	36.95	1.85	2.26	.10	25.65	20.55	31.20
Mag.....	200 deg. F.	5.71	59.45	2.18	.51	.10	3.61	2.70	72.85
Non-Mag.		11.18	35.80	3.00	2.75	.36	26.86	14.40	27.15
Mag.....	400 deg. F.	4.02	62.60	2.27	.18	.60	.79	2.00	73.85
Non-Mag.		10.01	36.25	2.86	2.24	.10	26.21	22.20	26.15
Mag.....	500 deg. F.	3.89	62.85	2.08	.13	.32	None	1.90	78.80
Non-Mag.		9.88	41.50	2.90	1.79	.10	20.73	48.30	21.20

By continual heating for some time at a temperature about 1500 deg. F., about 84 per cent. of the total iron in ordinary flue dust can be rendered magnetic.

The impurities in the dust may be eliminated by magnetic separation, either by the wet or dry methods, or by specific gravity. Either of the first two methods will recover only about 60 per cent. of the iron in the original dust, for as shown before all the iron present may not be in the form of magnetics. Below is given the performance of a magnetic separator on blast furnace flue dust, the iron and carbon percentages being shown for both magnetic and non-magnetic portions. Six different lots of flue dust are represented in the table:

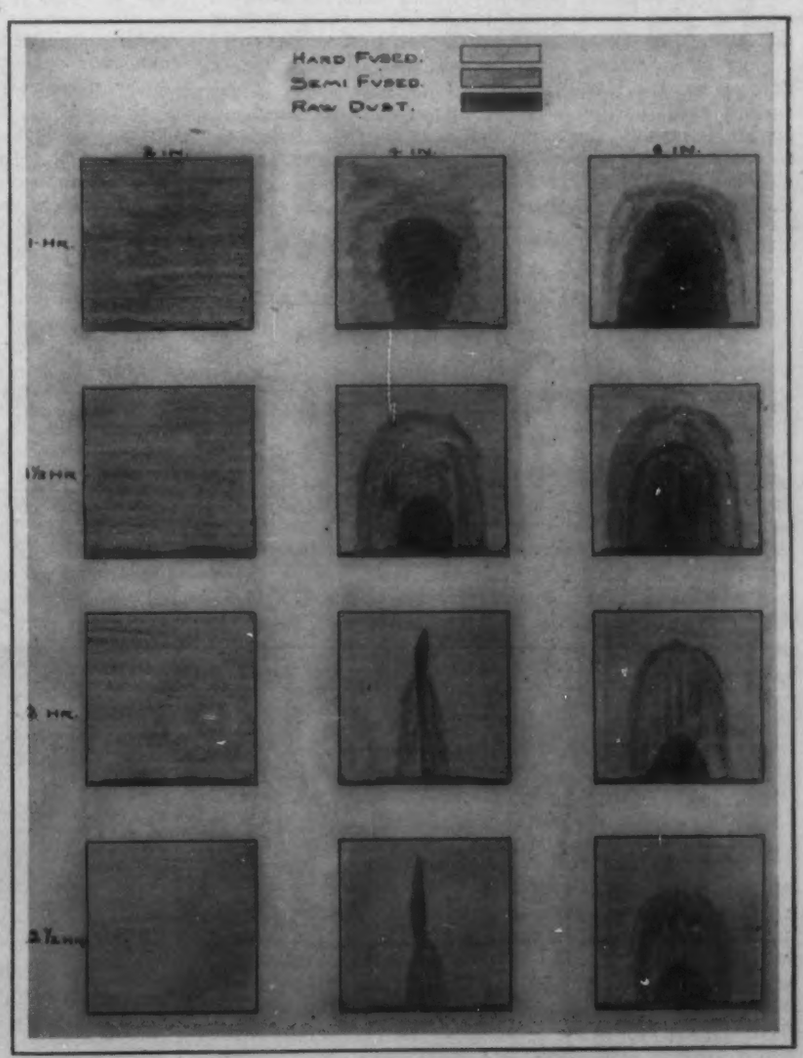


Fig. 1—Degree of Heat Penetration in Flue Dust Masses, 6 x 6-in. by 2, 4 and 6-in. Thick

	Magnetic Portion		Non-magnetic Portion	
	Iron Per cent.	Carbon Per cent.	Iron Per cent.	Carbon Per cent.
No. 1.....	60.83	3.23	33.87	27.08
No. 2.....	59.31	4.21	43.74	16.40
No. 3.....	64.15	2.15	43.59	15.08
No. 4.....	57.40	6.16	42.43	17.05
No. 5.....	64.95	2.75	48.58	10.70
No. 6.....	63.70	3.99	45.91	12.70

For briquetting by pressure and heat, lower carbon content is desired. The specific gravity method consists of passing the dry dust over a shaking porous bottom, air

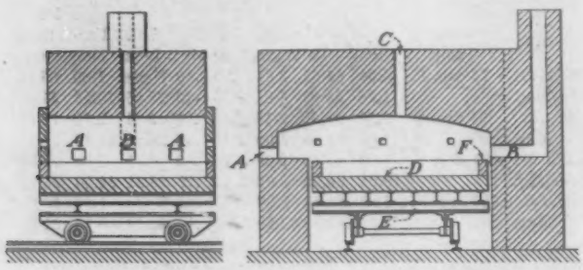


Fig. 2—Longitudinal and Cross Sections of the West Sintering Furnace.

being forced upward. This makes the lighter pieces of iron-bearing material and the coke dust rise to the top, where it is taken off by riffles to the side, the heavier material going one way and the lighter stuff in another direction. For this class of work this method gives decidedly better results. All the iron may be recovered if desired, or if a high iron content in concentrates is desired a small portion of iron will have to be sacrificed. In briquetting by pressure and heat the rule has been to combine these two methods, taking all the magnetics out that is possible, and then passing what remains over the specific gravity machines.

Table Showing Work of Specific Gravity Machines.

Tailings from Magnetic Separators.			Specific Gravity—Concentrates.			Specific Gravity—Tailings.		
Fe	C.	CO_2	Fe	C.	CO_2	Fe	C.	CO_2
38.30	22.12	1.81	44.60	8.91	2.75	21.4	46.35	1.58
45.40	11.89	1.38	49.50	9.43	1.65	28.8	31.69	1.89
37.70	16.25	2.10	47.50	10.65	2.12	25.5	37.95	1.65
40.60	14.98	1.65	47.20	6.42	2.69	....	.....	....
Ave. 40.50	16.30	1.70	47.00	8.60	2.30	25.2	38.70	1.70

By this combination of magnetic and specific gravity machines the iron loss for ordinary work may be only 10 per cent. In case a high iron content is desired, the specific gravity machine is far superior on this dust. Where high iron is desired the dust is classified by screening to give the best results, although screening or sizing may not at all times be necessary for obtaining certain desired results. Some of the results with specific gravity machines are shown in the following:

Carbon, Per cent.	Iron, Per cent.
2.66	64.05
3.62	61.52
4.93	60.42
3.45	62.03
2.72	62.84
2.49	62.53
1.51	63.04

Further adjustments in this specific gravity machine have produced even lower carbon contents.

There have been numerous attempts to use flue dust in a raw state. The majority of furnacemen would express a negative voice if they were to be asked the advisability of its use. A notable exception to this rule is the practice at the Ohio Works of the Steel Corporation. At this place it has been used for some years and with telling results. The tendency of the times are toward a treatment of some kind whereby the size of individual grains or masses will be increased.

Methods of Treating Flue Dust

Numerous methods have been practiced in treating the dust. All these come under the following divisions:

1. Mechanical pressing, with addition of some foreign substance to aid in holding the mass together.
2. By mixing the fuel with the material to be treated, igniting, and forcing air up or down, throwing the mass lying upon a porous bottom.
3. Rotary kiln.
4. Briquetting by pressure and heat.
5. Exposing a large surface of the dust to the action of the flame and addition of fresh material as fast as it will form an agglomeration.

The physical properties of all these methods differ greatly, and the object aimed at should be kept in mind before any one is selected. The considerations are: Methods of handling the product, distance to be transported, whether the product is to be stored or subjected to the action of the elements, etc. A redivision of the process, according to the physical properties of the product would be as follows:

Processes producing lump masses of considerable size:
- No. 4.—Grondal process.
- No. 5.—West sintering method.
- No. 1.—General briquetting process.

Processes producing a porous mass:
- No. 2.—Greenwalt, Dwight-Lloyd, Brown, Grasselli, etc.

Process producing small lump masses:
- No. 3.—Rotary kilns.

All of these methods are in operation with varying output. For the treatment of flue dust, briquettes by heat and pressure are probably producing more tonnage than any of the other methods, and a great many experiments have been made to adapt the apparatus to the peculiarity of the dust.

The West Sintering Apparatus

All the processes above named have been before the public for some time, with the exception of the West sintering method, which was patented by the Carnegie Steel Company in behalf of the writer, and which was the logical outcome of the production of lump masses for the blast furnaces as well as the open hearth, at the same time reducing the preliminary treatment of the dust to remove the carbon, by concentration (when it is desired) and pressing, to produce a mass that would have great strength and density, and stand a large amount of handling and weathering without serious deterioration.

The invention consists of a furnace with a movable bottom, on which a block of the material is built as fast as the continuous action of the heat will agglomerate or stick the particles together. The material can be delivered to the furnace in several ways:

1. Letting it fall from the roof and spreading out mechanically to form a thin layer.

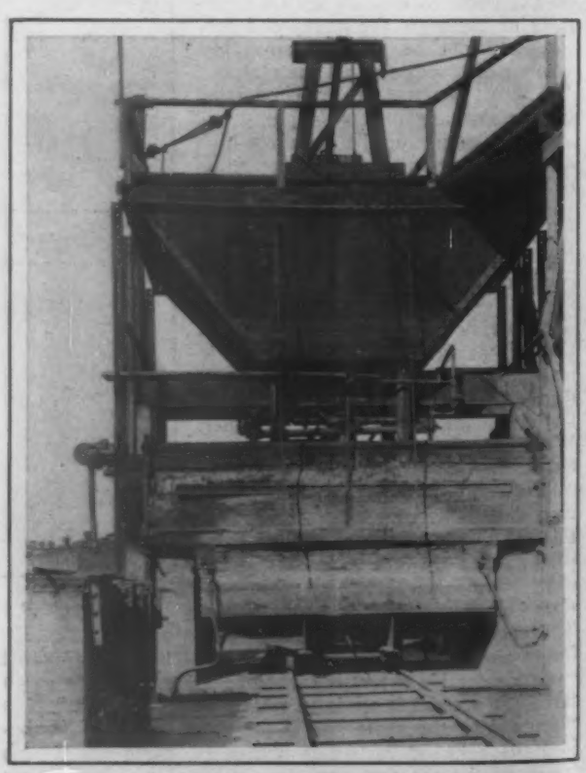


Fig. 3—A 20-Ton West Sintering Furnace

2. Using a kind of injector operated by air, moving it over the area.

3. Using a type of continuous furnace with the bottom moving slowly along, the dust being charged in definite places.

By all these methods we get a very thin layer of material subjected to heat, which softens it before another quantity is added. In any of these methods the charging may be so timed as to make the addition of the dust almost continuous. By the West method crude dust can be handled without regard to its peculiarities, and a very desirable product obtained. It does not require pressing, concentrating, etc., as in other processes, to produce lump masses. After the block or mass is built up to the capacity of the furnace it is withdrawn and the sinter removed by means of a crane; it is then broken to sizes that may be desirable. If this breaking is done while the mass is red hot there will be a minimum of effort and cost.

Construction of the Furnace

In Figs. 2 and 3 the construction of the furnace used in the West sintering method is shown. The flue dust is charged in a fine stream through an opening in the roof of the furnace, and is so highly heated that the particles of ore form a thoroughly sintered layer immediately upon reaching the hearth. In falling the finely divided solids are brought into intimate contact with the gases. The furnace consists of a roof and sides, with a longitudinal vault or passage through which the trucks carrying the movable hearths may pass. The sides of the furnace are equipped with burners, *A*. Passages *B* in one side of the furnace connect with the stack. Extending vertically through the roof is the opening *C*. The hearth *D* is made of suitable refractory material, supported upon the truck *E*. Each furnace is provided with several such trucks with the hearth prepared ready to be pushed into the furnace vault.

In operation, a layer of the fine ore or flue dust is laid upon the hearth, to a depth sufficiently thick to insure that the ore will not stick to the refractory bottom, the thickness of this layer being sufficient to prevent it being entirely heated to a plastic state. The furnace bottom is further prepared by building a wall *F* along the marginal edges of the top surface of the hearth. Refractory clay or brick are employed for this purpose. When the hearth has thus been prepared, it is moved into the vault of the furnace and curtain doors are lowered to cover both ends of the vault. The burners at the side of the furnace are then lighted and the furnace hearth or bottom is heated to the desired temperature, after which the sintering operation is begun.

Chemical and Physical Characteristics

Below are given results of analyses of flue dust and of West sinter, also the percentages of various sizes of the original material and the percentages of three sizes of the resulting sinter:

Fig. 4—Large Lumps of Sintered Flue Dust, the Product of the West Process

Fig. 5—Piles of West Sinter at Blast Furnace

Analyses of Crude Dust and Sinter

Crude Dust.			Sinter.		
	Per cent			Per cent	
Silica	8.77	13.50	Silica	9.60	8.50
Iron	47.19	49.50	Iron	64.20	66.20
Phosphorous	0.032	....	Manganese	....	0.56
Manganese	0.38	....	Phosphorus	....	0.049
Moisture	12.75	....	Al_2O_3	....	3.36
CaO	2.16	....	MgO	....	0.54
MgO	1.79	....	CaO	....	0.51
Carbon	10.20	....	Sulphur	....	0.12
Sulphur	0.05		FeO	....	.....
			Fe_2O_3	....	.....
			Carbon	....	0.34

Percentages of Dust on Sieves, with Size of Sinter.

	2	8	20	40	60	80	109	Through 100
Before treatment.	.65	1.2	7.02	17.37	31.53	7.93	5.49	28.79

	Per cent. ½-in.	Per cent. 2-in	Per cent. 5-in.
After treatment and unloaded at furnace bins	1	5	94

In cases where it was desired to make as large lumps as possible we have some of the following figures:

8 x 6 x 7	in. =	64 lb. net.
8 x 6 x 2	in. =	12 " "
7 x 4 x 3	in. =	13 " "
8 x 5 x 3	in. =	16 " "
6 x 7 x 2½	in. =	13 " "
7 x 5 x 4	in. =	16 " "
7 x 5 x 3	in. =	14 " "
7 x 5 x 2½	in. =	11 " "
7 x 5 x 2	in. =	11 " "

The iron in these lumps averaged 65 per cent. As the operation is under complete control at all times the resulting product may be either dense or porous; but at all times will there be a great deal of strength. The table below shows the properties of product made from flue dust by heat and pressure and that produced by the West method:

	Heat and Pressure. Per cent.	Sinter. Per cent.
Absorption	15.0	6.9
Porosity	37.0	13.9
Specific gravity	3.9	3.2
Apparent specific gravity	2.7	2.6

The chemical content of the product from this process, compared with that of some of the others, may be seen from the following table, crude dust being used at all times:

	Heat and Pressure			West Sinter			Rotary Kiln.	Porous Product.
Iron	61.4	61.7	60.9	65.7	64.2	66.3	58.07	58.3
Silica	9.0	8.2	9.2	9.7	9.6	8.5	10.68	11.3

Experience with Sinter—Cost of Plant

Under this method of production we have a superior

type of apparatus in which the heat degree can be kept practically constant and even over the whole surface of the mass, very little dependence being put upon conduction to do the work. This is very important, as was shown under the description of the physical properties of the dust. It is necessary regardless of the form of apparatus to have the heat distributed as widely as possible through the mass to be sintered. The product of the furnace shown has been used on blast furnaces with good results and did not seem to in any way disturb the regular method of operating. As high as 30 per cent. of the total ore burden has been withdrawn and an equal amount of sinter substituted without any derangement of required results.

With the growing scarcity of low silica, high iron ores for open hearth use it is becoming recognized that a substitute must be found. To this end the dust is concentrated, pressed and sintered into lump form. The tests using lump masses have given excellent results. Dense sinters from the pits have also given good results. The estimated cost to operate the various forms of briquetting and sintering apparatus is as follows:

	Porous Product.	Rotary Kiln.	Heat and Pressure	West.
Fuel	$0.05 (a)	$0.39 (c)	$0.35 (c)	$0.25 (c)
Labor operation... Labor repairs..... Material ..... All other costs....	.45	.61	1.25	.25
Total	$0.50 (b)	$1.00	$1.60	$0.50

(a) Gasoline cost for igniting fuel.
(b) Metallurgical and Chemical Engineering for September.
(c) Coal at $2 per ton (12,000 B.t.u. per lb.)

The cost of installing per ton day of 24 hr. in large plants is as follows:

Porous product	$150
Rotary kiln	300
Heat and pressure	400
West	100

If in proximity to natural gas or crude oil the last-named figure could be reduced to $80. Where blast furnace gases could be used the cost of the last three would be considerably reduced.

Our Coal Output Doubles Every 10 Years

An interesting fact in connection with the production of coal in the United States, according to the United States Geological Survey, is that in each successive decade the output is practically doubled. If the production of bituminous coal alone were considered, the record for the last 50 years would show an increase somewhat in excess of this ratio. The increase in the production of anthracite has been much less rapid on account of the limited area of the fields, the conditions under which the industry is carried on and the restriction of the prepared sizes to domestic consumption. It has been estimated that the output of anthracite will reach 100,000,000 gross tons annually before it begins to decline. The maximum production up to the present time has been 80,771,488 tons.

The statistics of coal production show that up to the close of 1865 the total output had amounted to 284,890,055 net tons. In the decade from 1866 to 1875, inclusive, the production amounted to 419,425,104 tons, making the total production up to the close of 1875, 704,315,159 tons.

In the following decade, from 1876 to 1885, inclusive, the output amounted to 847,760,319 tons, somewhat more than double the total production in the preceding decade. At the close of 1885 the total production amounted to 1,552,075,478 tons.

The production in the 10 years ended in 1895 was 1,586,098,641 tons, the total production at the close of 1895 amounting to 3,138,174,119 net tons.

In the decade ended December 31, 1905, the total production amounted to 2,832,402,746 net tons, and the grand total from the beginning of recorded coal mining in the United States amounted to 5,970,576,865 tons.

The average annual production from 1896 to 1905 was 283,240,275 net tons; the average production from 1906 to 1911, inclusive, was 461,499,260 tons, showing an increase of 178,258,985 tons, or 63 per cent.

Automatic Fire Protection Demonstrated

An impressive demonstration of automatic fire protection is being shown by the General Fire Extinguisher Company, Providence, R. I., at the water conservation exhibit being held in the court yard of the City Hall, Philadelphia, Pa., under the direction of Morris L. Cooke, director of public works, and a committee appointed by Mayor Rudolph Blankenburg, of which H. W. Benjamin, of the water bureau, is chairman.

The automatic fire protection exhibit, a photograph of which is here reproduced, consists of a 10 x 10 x 10 ft. Detroit Fenestra steel-sash building, with a roof of the same character, surmounted with a Drouve ventilator. Wire glass windows made by the Mississippi Wire Glass Company, are used in the sash. The bottom of the building is covered with asbestos board and a pyramid of the same material, 2 ft. square at the base and 3 ft. high, is erected in the center. Above the pyramid is suspended a single Grinnell automatic sprinkler with a fusible link, adjusted to melt at 155 deg. and operating under a water pressure of 75 lb.

In making the demonstration of the device, the pyramid and base are saturated with alcohol, strontium salts being added to produce a color effect when the alcohol is ignited. A lighted match is thrown into the booth and it has been demonstrated that 15 sec. after the alcohol is ignited the temperature rises to the fusing point of the link, opening the sprinkler, and in 15 sec. after the sprinkler begins to operate the fire is quenched.

In addition to the demonstration by the sprinkler there is shown in operation in connection with the same, the Grinnell straightway alarm valve, which provides a means of

Educating the Public in Philadelphia in Regard to the Automatic Fire Extinguishing Sprinkler

giving notice that a fire is in progress. Through the alarm valve the water supplied to the sprinkler must pass. The flow of water operates to close an electric circuit which operates alarm bells, located at desirable points. The device provides for the variation in water pressures, so that by any unequal pressure operating on the valve, the possibility of a false alarm is avoided. The exhibit will be continued through October, and demonstrations are being given every 15 min. for the greater part of the day and evening.

The Society of Chemical Industry, New York Section, will hold its next meeting at Rumford Hall, 50 East Forty-first street, New York, on Friday evening, October 25. Prof. M. T. Bogert, president of the society, will review the life and work of the late Dr. Morris Loeb. James B. Douglas, manager, and J. F. Conner, assistant manager of the claim department, United Gas Improvement Company, Philadelphia, will describe and demonstrate the system of rendering aid to men injured, suffocated, overcome by noxious gases, electric shock, etc., as developed under their personal direction and as applied in the plants of the U. G. I. throughout the United States.

Gasoline Engine Electric Generating Set

A self-contained gasoline electric generating set has been developed by the B. F. Sturtevant Company, Hyde Park, Mass., to meet a very widely varied demand for units of small power. The special purpose of the set is to generate current for lighting and power in localities where public facilities are absent, but the field is much more general than this, and includes power for small manufacturing establishments, on ships and as auxiliaries in large power stations. Fig. 1 is a view of the set, while Fig. 2 shows the special design of centrifugal vertical throttling governor employed.

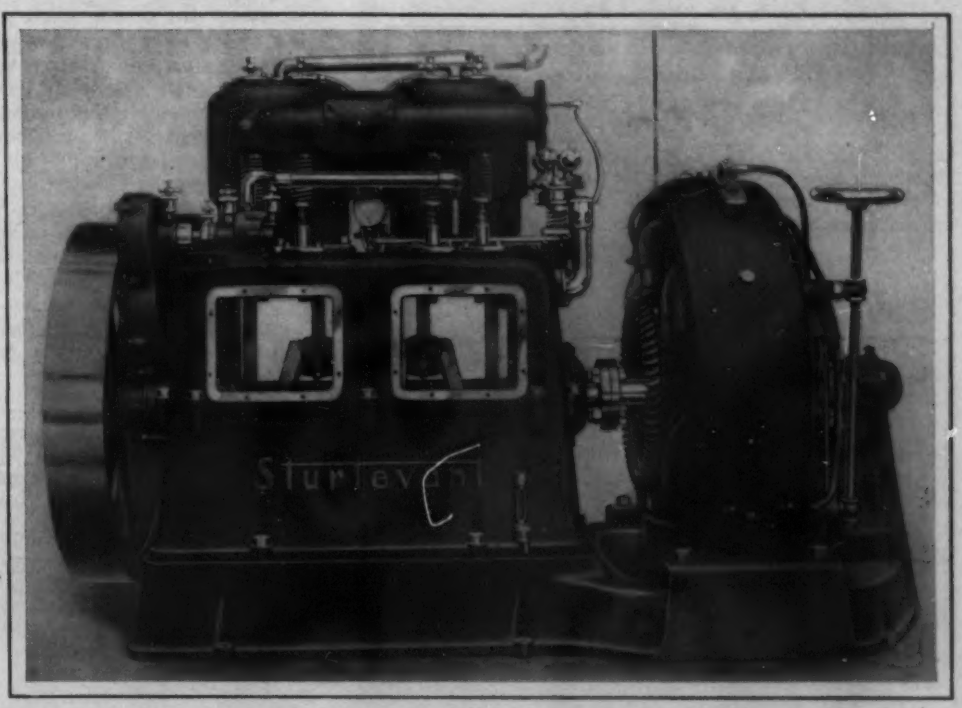


Fig. 1—The New Gasoline Engine Electric Generating Set Built by the B. F. Sturtevant Company, Hyde Park, Mass.

The set consists of a standard Sturtevant generator, direct-connected to a gasoline engine which has been designed recently by the company's engineers. It is of the four-cycle, water-cooled vertical type, with either four or six cylinders, according to the size of the unit—5, 10 and 15 kw., capable respectively of lighting 200, 400 and 600 20-cp. tungsten lamps. A long stroke engine was chosen as the most efficient for the service. Both engine and generator are capable of operating under an overload of 25 per cent. for 2 hr.

The bore of the cylinders of the two larger sizes of engine is 4 in. and the stroke 6 in., while the 5-kw. machine has a 3¾-in. bore and 5-in. stroke. The cylinders of the larger sizes are cast in pairs, having T-shaped heads with inlet valves on one side and exhaust valves on the other. In the small unit the cylinders are cast *en bloc* with inlet and exhaust valves on the same side. The water jackets are all integral. Great pains has been taken in the selection of materials and in the design of pistons, crankshaft, camshafts and the other working parts.

Fig. 2—The Special Type of Centrifugal Vertical Throttling Governor Used

An improved system of forced lubrication is used, insuring perfect oiling of all moving parts and bearing surfaces, and permits their continuous operation for long periods without adjustment. The system is automatic and self-contained, requiring no separate tanks or outside piping. A geared pump, located in the base of the engine, furnishes oil under 20-lb. pressure. It is gear-driven from the camshaft and is positive in operation. The oil enters the main bearings and flows through the crankshaft to the crank pins, whence it passes up the connecting rods to the piston pins. The oil spray thrown off by the centrifugal action of the crankshaft covers pistons and cylinder walls. Oil under pressure is also supplied to the camshaft and governor bearing. The oil falls back into the base, where it passes through a filter before being used again. The base holds sufficient oil for 50-hr. continuous use without renewal.

The engine is controlled by a specially designed throttling governor of the centrifugal type, Fig. 2, operated through bevel gears from the end of the camshaft. A ball bearing between the regulating spring and the governor balls permits the spring to remain stationary and allows adjustment of the governor to be made while the engine is in operation. The motion of the governor is transmitted to the throttle valve placed in the inlet manifold. The design is such that the governor will control the speed of the engine to so close a degree of regulation between no load and full load that voltage variations due to sudden changes in load are practically imperceptible, and therefore no storage battery is necessary to maintain a constant voltage, the generator supplying current directly to the lighting or power circuit.

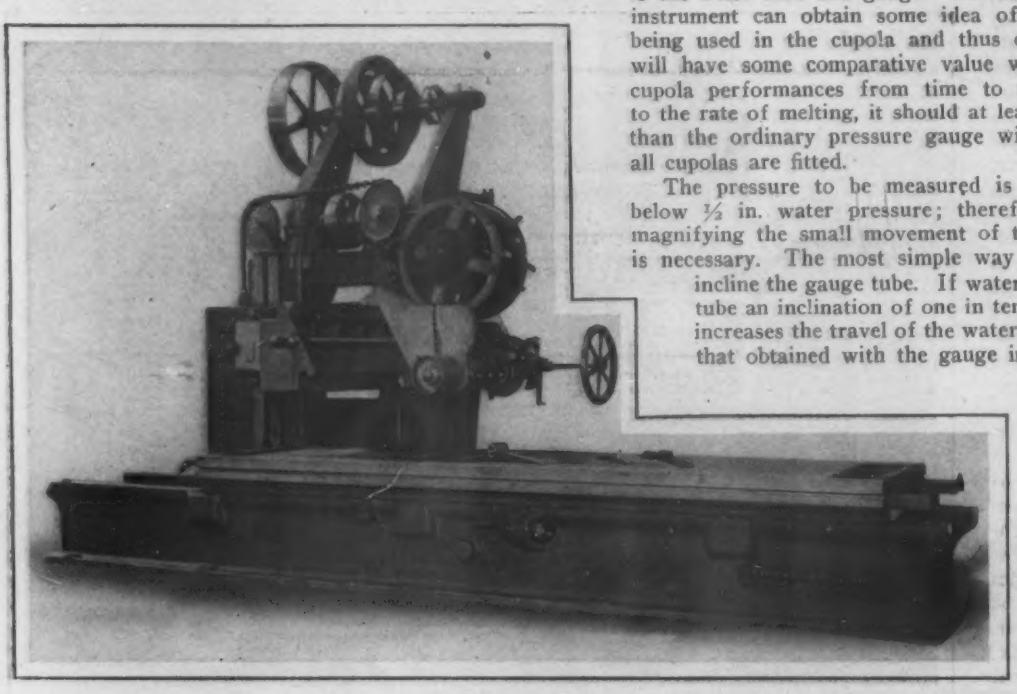
Concrete Highways

The latest development in securing good roads is through the use of concrete. This new type of road is now the subject of extended experiments by the United States Government. It has met with such pronounced success in Wayne County, Mich., as to give that locality national celebrity. In brief, a concrete road is akin to cement sidewalks, being a water-shedding, indestructible monolithic mass. The Association of American Portland Cement Manufacturers, Land Title Building, Philadelphia, Pa., has published for free distribution a comprehensive book entitled "Concrete Highways," prepared by expert road engineers, which goes into every detail of construction, concluding with a tabular digest of concrete pavements in all sections of the country. The book, which is handsomely and profusely illustrated, contains nearly 100 pages. The various chapters treat of bituminous compound wearing surfaces, grouted pavements, reinforced concrete pavements and specifications for the one and two-course types. Road supervisors will find it of especial value, while the taxpayer will be extremely interested in the economical results obtained by the introduction of these durable concrete highways.

The Iron Trades Employers' Insurance Association (Ltd.), is the largest mutual society in Great Britain undertaking employers' liability insurance, and its experience therefore supplies a measure of the risk in respect of an important class of trades. From the annual report recently made public it appears that the premiums received during 1911 amounted to $1,094,417. Claims are given at $824,219, and expenses were $76,092, or 6.95 per cent. of the premiums. There is thus a substantial margin as a result of the year's operations.

Improved Open Side Grinding Machine

For grinding pieces such as railroad frogs, switches and crossings, safe and vault parts and other similar articles made of materials that are not workable with steel cutting tools, the Detrick & Harvey Machine Company, Baltimore, Md., has designed a grinding machine of the open side planing machine type. The machine which is said to have proved particularly efficient for this class of work consists of a regular type reciprocating table, bed, post and cross-beam of the builder's standard open side planing machine, which was illustrated in *The Iron Age*, August 15, 1912. Instead of the ordinary cutting tools, however, a grinding wheel carried in a saddle which can be fed up or down or longitudinally or transversely with reference to the bed of the machine has been substituted.



A New Open Side Grinding Machine of the Planer Type Built by the Detrick & Harvey Machine Company, Baltimore, Md.

The grinding wheel is driven by an independent motor, mounted on the same saddle through a belt drive, and the wheel can be mounted on either side of the spindle, which is made of steel and has a carefully ground fit in long bronze bushings. The saddle carrying the wheel and the motor has a sliding fit on the cross-beam and can be traversed across it by hand operation from either side, the power feed screws having ball thrust bearings to insure easy operation. If desired, however, a power cross feed can be attached. The cross-beam of the machine is carried on the face of the post with a sliding fit, and can be fed up or down by hand or power, as may be desired. A counterbalance renders this adjustment easy.

The table is gibbed on the side next to the post, and is operated by a spiral pinion and rack. The motion can be controlled from either side of the machine, the reverse movement being obtained by shifting belts. The drive of the table is through a countershaft mounted on the post. The table speed is 50 ft. per minute in either direction, and is operated independently of the grinding wheel.

The machine is made in two sizes. The hight of the work accommodated in both cases is the same, 18 in., but the maximum widths are 48 and 56 in. respectively. The length of bed can be varied within reasonable limit to suit the requirements of the purchaser, the machine illustrated in the accompanying engraving having an 18-ft. bed. The grinding wheel used on this machine is 18 in. in diameter, has a 3-in. face, and runs at a speed of 1300 r. p. m. The weight of the machine is 59,000 lb.

The annual meeting of the National Metal Trades Association will be held at Hotel Astor, New York, Wednesday and Thursday, April 9 and 10, 1913. The dates were chosen by the Executive Council which met in New York last week.

A Blast Velocity Gauge for Cupola*

BY P. MUNNOCH†

The most simple form of apparatus which can be used to measure the velocity of air passing through a blast tube is the Pitot tube and gauge. The foundryman with this instrument can obtain some idea of the amount of air being used in the cupola and thus obtain figures which will have some comparative value when compared with cupola performances from time to time. As an index to the rate of melting, it should at least be of more value than the ordinary pressure gauge with which practically all cupolas are fitted.

The pressure to be measured is very small, usually below ½ in. water pressure; therefore some means of magnifying the small movement of the column of liquid is necessary. The most simple way of doing this is to incline the gauge tube. If water is used in the gauge tube an inclination of one in ten from the horizontal increases the travel of the water column by five times that obtained with the gauge in a vertical position. Water is not satisfactory owing to the sides of the tube becoming dry and resisting the movement of the liquid and also preventing it from returning to zero after being in use. Common kerosene is more suitable, but as the specific gravity is less than that of water a greater inclination to the horizontal is necessary to give the same five-to-one travel. With kerosene of 0.795 specific gravity an inclination of one in 7.95 in. is necessary. Instead of the inclined tube, some form of differential gauge may be used for increasing the magnitude of the readings; where a portable gauge is required this type of gauge is more suitable. There are two forms listed in chemical catalogues.

For the purpose in view a scale can be constructed from which we may read off either velocity or quantity in cubic feet per unit of time, one second being a suitable unit. The accompanying table shows velocity in feet per second for different indications of the water gauge. With blast pipe of 1 sq. ft. area the readings would indicate cubic feet per second.

Water gauge in inches.	Velocity in feet per second.	Water gauge in inches.	Velocity in feet per second.
0.006	5	0.295	35
0.024	10	0.386	40
0.054	15	0.498	45
0.096	20	0.603	50
0.150	25	0.740	55
0.217	30	0.869	60

The inclination of the gauge tube multiplies the movement of the liquid five times; the Pitot tube described, having one limb operating by pressure and the other by suction, multiplies the movement by two, the net result is that the movement of the liquid in the gauge is magnified ten times. Tenths of an inch on the scale will therefore represent hundredths of an inch, and scale to read in cubic feet per second is calculated and marked off to correspond. To obtain an average reading, the Pitot tube is inserted from one-sixth to one-fifth of the diameter into the blast pipe. It should also be inserted in a straight length of pipe, as far as possible away from bends.

The New York State Steel Company, Buffalo, N. Y., is repairing its open-hearth plant with the purpose of starting operation on billets and blooms about November 1. As soon as present contracts for foundry pig iron are completed, the company's blast furnace will be changed to the production of basic for its own use.

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*From a paper entitled "Air Required for Combustion in the Cupola, and a Single Blast Velocity Gauge," presented before the American Foundrymen's Association, Buffalo, N. Y., September 26.

†American Brake Shoe & Foundry Company, Mahwah, N. J.

Safety Device Practice and Accident Prevention

The Engineering and Inspection Division of the Travelers Insurance Company and the Travelers Indemnity Company, Hartford, Conn., is preparing a new series of pamphlets covering the subject of safety devices, approved practice and general accident prevention in different lines of work and processes. The series is designed to cover the whole field of mechanical appliances and factory conditions, in so far as they are inimical to the lives and physical welfare of employees. These pamphlets are based upon an unequaled experience in liability work and upon a thorough study in exhaustive detail of the best domestic and foreign practice in the safety of operation of plants and machinery.

The first pamphlet in the series which deals with the subject of grinding wheels has just been issued. It discusses in considerable detail the speed, equipment and method of operation of this class of equipment. In addition to the text there are tables giving the speed measured in revolutions per minute corresponding to certain rim velocities in feet per minute, and there are a number of sketches of safety hoods, ring guards, safety flanges and dust shields as well as one showing the correct mounting for grinding wheels.

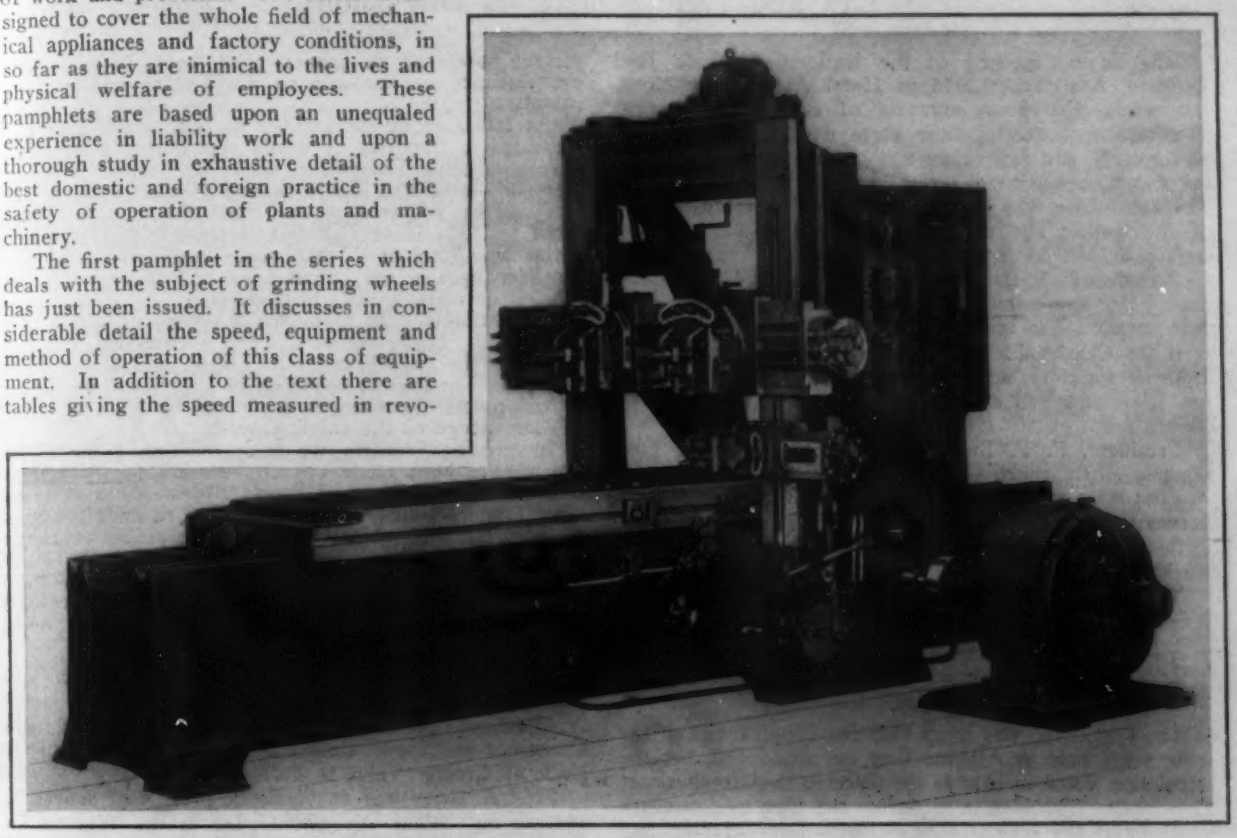
In addition to these pamphlets a new monthly publication known as the Travelers Standard is being issued, to deal with engineering matters of all kinds, but with especial reference to safety engineering as applied to construction work, manufacturing, mining, power generation and transmission, the electrical and chemical industries and every other form of activity in which machinery or tools are used or human life or limb is imperiled in the doing of productive work.

Bagley, Mills & Co., engineers and contractors, with offices in London, Eng., and at 50 Church street, New York, note recent contracts with four large German works for Carl Still benzol recovery plants. The total number of by-product coke ovens served by these recent installations is 770. At one of the plants of the Bochumer Verein, Bochum, Westphalia, the installation consisted of a benzol recovery and rectification plant of 200 ovens. For the Concordia Bergbau Aktiengesellschaft at Oberhausen the contract called for the rebuilding of the existing benzol plant and the erection of a benzol first products plant for 60 ovens and a rectification and washery plant for 300 ovens.

The production of lime in the United States in 1911, according to a report by Ernest F. Burchard, just issued by the United States Geological Survey, was 3,392,915 net tons, as compared with 3,505,954 tons in 1910. The average price a ton in 1911 was $4.03, as compared with $4.02 in 1910. The five leading States in 1911 were: Pennsylvania, with 841,723 tons; Ohio, 405,562 tons; Wisconsin, 250,638 tons; West Virginia, 179,966 tons, and Missouri, 158,368 tons.

Planing Machine With Reversing Motor

The Woodward & Powell Planer Company, Worcester, Mass., has designed a planing machine which is driven by a reversing motor having the Triumph-Monitor system of control, that has been developed by the Triumph Electric Company, Cincinnati, Ohio. As will be noticed from the accompanying engraving the 36-in. machine is without overhead gears, belts, beltshifter or driving pulleys. The motor is coupled to the driving shaft and the controller is fastened to the housing.



A Planing Machine with Reversing Motor Drive Built by the Woodward & Powell Planer Company, Worcester, Mass.

The operation of the machine is simple, the control being from a tumbler handle which is connected by a rod to a small reversing switch on the side of the bed. To start the machine the handle is turned slightly, the direction of the platen being determined by the position of the tumbler, while dogs determine the length of stroke, which can be varied from 6 in. to the full length of the table. The reversing is, of course, automatic. The speed may be varied from 10 to 17 steps, according to the size of the machine, both on the cutting and return strokes, by adjusting small rheostat arms on the controller panel. The table may be stopped instantly at any point of its travel by a touch of the tumbler handle. The operator is said to require no extra skill to operate the new type of machine.

The claim is made that direct drive increases the output of a machine 50 per cent., due to higher platen speeds and deeper cuts and coarser feeds. Because of the uniformity of the speed under all conditions, it is stated, the quality of the work is improved, a cleaner, smoother cut being obtained. Vibration is removed by locating the driving power on the floor.

The Trio Mfg. Company, formerly located at 1519 East Thirty-second street, Cleveland, Ohio, has moved to larger quarters at Seventy-eighth street and Broadway. It manufactures sanitary steel medicine cabinets, bath room stools, factory lockers, tool racks, shelving, etc.

The Virginia Iron, Coal & Coke Company, Bristol, Va.-Tenn., is stated to be planning the resumption of operations at its blast furnaces at Middlesborough, Ky. A number of changes and improvements will be made in the plant.

The Machine Tool Builders

The Annual Meeting One of Exceptional Interest—Export Trade, Patent Law and Tariff Subjects of Discussion

The annual meeting of the National Machine Tool Builders' Association, held at Hotel Astor, New York, last week, proved an occasion of exceptional interest. The sessions extended over three days, instead of two as formerly, and more time was given to the meetings of the committees of the several sections of the industry. The attendance was large and thoroughly representative of the trade. The proceedings of the opening session were published last week.

President E. P. Bullard, Jr., was re-elected for a second term. The semi-annual meeting will be held in New York next spring. The name of the organization will remain as it is. Charles L. Taylor will succeed Charles E. Hildreth as secretary, and General Manager James H. Herron, Cleveland, will extend his duties. The full board of officers follows:

President, E. P. Bullard, Jr., Bullard Machine Tool Company, Bridgeport, Conn.

First vice-president, A. T. Barnes, W. F. & John Barnes Company, Rockford, Ill.

Second vice-president, R. K. Le Blond, R. K. Le Blond Machine Tool Company, Cincinnati, Ohio.

Treasurer, Albert E. Newton, Reed-Prentice Company, Worcester, Mass.

Secretary, Charles L. Taylor, Taylor & Fenn Company, Hartford, Conn.

Résumé of Business Dispatched

The suggestion was made that the spring meeting, for some years held at Atlantic City, be abandoned, but the association voted to change the place to the Hotel Astor, New York. The idea is to devote the time to committee meetings of the several sections, with brief opening and closing association gatherings.

The committee on resolutions, E. M. Woodward, chairman, reported a resolution that the present association name be retained, and this was adopted. Another resolution indorsed the creation of a Federal commission for the revision of the tariff.

Concerning the subject of an association catalogue, the matter was left in the hands of a committee of which Stanley H. Bullard is the chairman, with associates as follows: B. B. Quillen, Cincinnati Planer Company, Cincinnati, Ohio; C. N. Norton, Norton Grinding Company, Worcester, Mass.; S. H. Reck, Rockford Drilling Machine Company, Rockford, Ill.; C. A. Johnson, Gisholt Machine Company, Madison, Wis.

The Oldfield Patent Bill

Charles L. Taylor, chairman of the committee on patents, stated in his report concerning the Oldfield bill:

The original bill provided for many radical changes in the existing patent law. It was reported to the committee on patents, and after numerous hearings was reported on August 8 in a revised form which really amounted to a substitute bill, and in which many of the more radical provisions were modified. No action was taken by Congress before adjournment, but the bill will probably receive consideration during the coming session.

Although many of our members are undoubtedly familiar with this bill, it may be well to call your attention to certain sections that provide for the compulsory granting of a license under certain conditions; prohibit the use of a patent to restrain unreasonably, or to monopolize trade or commerce, except in such articles as, and to the extent that they, embody the invention or discovery so patented; that refer to the restriction of the resale price of the patented article; the limitation of its sale, the restriction of its sale to certain customers or in certain territory, and the granting of terms and conditions of sale more favorable to one customer than to another.

Your committee suggests that each member secure a copy of the bill as reported, read it thoroughly, and carefully consider the full meaning of these proposed changes. Besides studying the bill and its effect if enacted into law, it might be well to consider what abuse, if any, has grown up under our present system, and what changes for the benefit of the general public could be made without injustice or hardship to the owners and users of patents.

As indicated by the number of bills which have been presented to Congress, it would appear that a strong influence is being brought to revise our patent laws, and every one interested should become familiar with the subject and be prepared to act when the matter is again taken up. President Taft has recommended that a committee be appointed to take under consideration all proposed changes in our patent laws, and to report the results of its investigations to Congress.

We strongly urge that such a course of action shall be pursued. If the patent law needs correction, it should be revised by experienced men rather than as a political measure. The present condition of affairs will not be improved unless the changes are made by men who have full knowledge of the existing needs.

In previous reports we have mentioned the efforts which have been made toward securing the passage of a law creating a Court of Patent Appeals. Owing to the many matters which were brought before the last session of Congress, this subject was not given proper consideration. However, many leading members of both Houses are impressed with the necessity of creating such a court, and there is no doubt that Congress will act either upon the existing or modified bills if this matter is pressed upon their attention.

In regard to this subject the association listened with much interest to a carefully prepared paper by Samuel W. Banning, of Banning & Banning, patent attorneys, Chicago, on "How United States Patents Might Be Made of Greater Value to Patentees."

Fred A. Geier was unable to be present to deliver his address on "What We Should Do in the Way of Influencing Tariff Legislation," but C. Wood Walter made a very able talk on the subject.

J. O. Harron, Harron, Rickard & McCone, San Francisco and Los Angeles, addressed the association, urging the participation by members in the coming exposition at San Francisco. The matter was placed in the hands of the Exposition Committee.

An executive session closed the formal proceedings, after which a "mock session" was carried out, with witty, mirth-producing features which were enjoyed greatly.

A Mechanical Section

E. J. Kearney, Kearney & Trecker, Milwaukee, Wis., presented an interesting paper entitled "How the Association Could Be Benefited by the Formation of a Mechanical Section." Mr. Kearney was unable to be present because of sickness, and his paper was read by Secretary Charles E. Hildreth. He reviewed the history of the machine tool industry with relation to the forces that have been active in bringing it from obscure job shop methods, both as regards manufacturing and selling. The matter of comparative lists was given attention, concerning which the paper stated:

It appears most often in the form of parallel columns, one of which is devoted to the good points of Knocker's machine, say a lathe, while the opposite column is devoted to the weak points of Easy's lathe. The first column will have sub-heads, as, for instance, General Design, Bed, Headstock, Apron, etc., of Knocker's lathe, in which all the good points are mentioned, with all poor points omitted; while the second column will have the same heads applying to Easy's lathe placed opposite corresponding sub-heads in column 1, but with all the good points omitted and the poor ones roasted unmercifully. The making of these lists is not the business of the mechanical department, which should be more concerned with the good points of competing machines and trying to excel them rather than engaging in muck-raking for the benefit of a sales force too weak for their position and too ignorant of mechanics to appreciate its ethics.

THIS METHOD OF SELLING FRAUGHT WITH DANGER

That this practice is not confined to our industry I know full well, for the superintendent of a large factory

in a wholly different line told me that he had withstood for more than a year the repeated demands of the sales department for information of this kind. The particular line of business in which he is engaged has not progressed to the fortunate position of this one—of competition with friendship between the competitors. That this method of selling is fraught with grave danger is apparent to any one who will stop to think. I have in my possession a disgraceful detailed comparison of two first-class machines made in Ohio that would make the pioneers turn in their graves. We cannot expect the friendships now so beneficial and pleasant to withstand onslaughts of this sort or that doubtful ethical methods of selling will not lead to still more doubtful methods, and, in the end, to price cutting and disaster.

We have arrived at a most opportune time for a discussion of this subject. Business is good, so that no unusual efforts need be made to satisfy the most ambitious with the volume of orders. The question is, Shall the association indorse the practice of making comparative lists of points, and thereby make it universal, or will it frown upon the practice and thereby reduce the number of users and minimize its effect? I can see no benefit to be derived either to us as manufacturers or to the users by its continuance and extension, but I can see great benefit that will come to the association if some of this misguided effort can be turned to the making of better machines.

THE MECHANICAL END AND THE SALES ORGANIZATION

I do not expect that the mechanical end can ever be reinstated in its old position of supreme importance when coping with a sales organization that reaches round the world, but we must not lose sight of the fact that in order to be successful in the markets of the world we must be able to offer at all times the best and the most advanced design to be found anywhere, and I stand as an advocate of any plan that will further that end. If this can in a measure be brought about, together with a high professional spirit that will eliminate some of the abuses referred to, then I have indicated how great benefits may come to this association by the formation of a mechanical section. How this is to be accomplished and maintained to the best advantage is another question.

It is more difficult in these days, when all-round skilled help is at a premium, for the superintendent and foreman to get away from their work than any other set of men connected with the plant. This does not apply with the same force to men connected with the designing end of the business. It may be under these conditions doubtful if any large number can be assembled here in New York for a two or three days' session devoted to things of interest to them.

Our splendid trade papers are alert to secure and publish anything of general interest to shop men and designers, and nearly all connected with the industry depend largely on these papers for their information; but of course there is lacking the benefit that would come from the personal touch.

It has occurred to me that the annual convention could be extended to five or six days, with the last two or three days given up entirely to subjects that will be of general interest and benefit in perfecting the machines that we make; or, in place of the longer session, a three days' session, with meetings held by the different departments in separate rooms.

Another subject for discussion at this time has presented itself, and that is the holding here in New York by the association at stated intervals of five or more years an exhibition of metal-working machinery, restricting each exhibitor to one machine of a type, and permitting no machine to be exhibited that did not show noteworthy improvement over the machine shown by the same builder at the previous exhibition.

While such a thing may not be practical, I am convinced that if it could be worked successfully it would not only be a stimulus to the design, but would be of great use to the sales end of the business, as it would be sure to be attended by buyers of machinery from all parts of the world.

The Convention's Social Side

The social side of the convention was very pleasant. On Thursday evening the American Machinist gave a theater party. On Friday evening Edward Rivett, president Rivett Lathe & Grinder Company, Faneuil, Mass., entertained a large party of ladies and gentlemen at dinner, and Machinery's outing on Saturday was greatly enjoyed by a large and representative party of builders of and dealers in machine tools and kindred equipment. Many small parties punctuated the week.

Machine Tool Dealers' Meeting

Machinery Section of National Supply and Machinery Dealers' Association Hears Reports and Discusses Problems

The second annual meeting of the machine tool dealers held under the auspices of the National Supply and Machinery Dealers' Association was called to order at Hotel Astor, New York, on the morning of October 17 by President W. L. Rodgers, Pittsburgh Gage & Supply Company, Pittsburgh, who, after an introductory address, turned the meeting over to Henry Prentiss, Prentiss Tool & Supply Company, New York, as chairman. Mr. Prentiss, as vice-president of the association, has charge of its machinery section. He said:

Vice-President Prentiss's Remarks

We are in a more contented frame of mind than a year ago, growing out of improved business conditions and brighter prospects. Although we are in the midst of a unique and seething political campaign, we are only remotely touched by its agitation. Business interests seem to have reached the conclusion that with an abundant harvest incalculable in money value and enlarged activities in all directions, we are assured of a prosperous future in spite of the tariff cloud which hangs in the sky and is threatening to enlarge its borders. I do not wish to refer to this in a political way other than to urge upon your attention the necessity of enlisting our activities and using our influence in behalf of a conservative course in the revision of the tariff as it touches our manufacturing industries, which will be menaced by the importation of machinery in whose construction cheap labor is employed.

We face a condition which calls for greater efficiency in the conduct of our business; we must study to secure a larger volume and at less expense. In view of the tariff agitation we cannot at present, at least, hope to obtain from our manufacturers larger selling commissions, although in many instances these are sadly needed. The burning question to-day is, How can we secure more productive net results in the fields in which we are operating? What is the right answer to this question? Let us consider it in all its bearings and exchange views freely. The salient features of greater efficiency seem to me to include firm adherence to the manufacturers' resale prices; carrying of stock by the manufacturers; uniform terms; factory delivery; non-cancellation of orders; confining our operations to our exclusive territory; fair and courteous treatment of our competitors; intelligent and energetic attention to our own business.

It is to be regretted that a number of our prominent dealers do not take an active interest in our association. We must renew our efforts to secure their membership and thus strengthen our position as an association in the business world. The recognition of our common experiences and needs has drawn us together in a spirit of friendly co-operation and unity, to work over and solve our perplexing problems in a way to bring out productive results, not only to ourselves but to our manufacturers and patrons as well. Let us continue this good work, realizing that its fruitage of friendliness, mutual consideration and individual and collective betterment is assured.

The programme of the meeting embraced consideration of a number of matters pertinent to the daily problems of the dealers, and the discussions were entered upon and followed with interest by the 50 who attended, many of them from the South and West, not even the Pacific coast failing in representation, as J. O. Harron of Harron, Rickard & McCone, San Francisco, was present. Mr. Harron is second vice-president of the association. While the sessions of the meeting were executive in character, they were open to all machinery dealers irrespective of association connection.

Secretary-Treasurer Fernley's Annual Report

In his annual report Thomas A. Fernley, secretary-treasurer of the association, touched on the varied activities of the past year. His first reference was to the distribution immediately after the previous convention, of the result of a secret ballot on the cost of doing business. On this subject he said:

It showed that the expense of distributing machine tools was practically as high as it had been and still averaged between 11 and 12 per cent. on the selling price. This result has been accurately reached from the records of the houses furnishing data and accepted by the machine tool dealers with the assurance that it honestly

represents the real cost of distributing machine tools. Our request has been that manufacturers' commissions or differentials be arranged with a view to affording a net profit after defraying the selling expenses. The arguments advanced have been that it is to the interest of the manufacturers that the dealers should receive such compensation as would justify them in aggressively promoting the sale of their tools.

In a subsequent discussion it was agreed that there could not be any decrease in sales cost without too greatly limiting representation.

Mr. Fernley also gave attention to what had been done in the matters of freight classification, credits, uniform proposal blanks, compensation of salesmen, tariff legislation, manufacturers' competition and maintenance of prices. He said that there had been several cases where manufacturers of machine tools have quoted consumers as low a price as they have quoted dealers, the unfairness of this position being admitted by a large majority of the reputable tool dealers, but it being evident that "there are some manufacturers who are not as fair in their treatment of the trade as they should be." The report concluded:

This organization is not a price regulation organization. It does not attempt to dictate to its members at what prices they should sell their tools. Such action would be illegal and possibly ineffective. The organization is, however, on record as urging that its members respect the established selling prices of the manufacturers. Cases have been reported to us from time to time where a commission of 12½ per cent. has been given by the manufacturer to the dealer coupled with the request that he respect the manufacturer's selling price and not quote under that price. Cases have been reported to us where the dealer has given 5 or 7½ per cent. under the manufacturer's selling price. Now there may be two inferences drawn from such quotation—either the manufacturer's commission of 12½ per cent. is too liberal or the dealer is giving away a part of his profit which would involve him in a loss, for, unless he is so fortunate as to have no selling expense, he is actually losing money.

Other Matters Considered

The first session was brought to a close with an address by C. Wood Walter, Cincinnati Milling Machine Company, on the "Tariff on Machine Tools." In opposing the removal of all duties on machine tools the dealers have acted with the manufacturers.

The second session opened with the report of the Machinery Committee submitted by its chairman, O. P. Meckel, Baird Machinery Company. Ensuing discussions disclosed a consensus of opinion that dealers should receive an increased commission on machines and supplies purchased for stock; also that where conditions and locality justify the dealer may properly be expected to maintain expensive display rooms. It was also the prevailing opinion that there is little if any encroachment by dealers on the territory of others, especially where exclusive sales contracts exist and that there is marked improvement in this respect.

In the course of its third session, October 18, the conclusion was reached that dealers very generally respect the selling policies and schedules of the manufacturers and that the lesser deviation from this desirable attitude is largely because of the educational influence of the association, with a realization that price cutting is unprofitable.

The last session, aside from discussing terms of sale, took up the subject of sales of machinery to educational institutions and it was the accepted opinion that such institutions are not entitled to special discounts and should not receive them. It was argued that such sales ordinarily cost more than those to business concerns and that if dealers felt inclined to help along the institutions they might better give cash.

The production of pig iron in Belgium in the first eight months of this year, compared with the corresponding period of 1911, was as follows: Forge, 25,810 metric tons, against 64,430 tons; foundry, 65,490 tons, against 31,990 tons; basic and Bessemer, 1,442,790 tons, against 1,288,900 tons; total, 1,534,090 tons, against 1,385,320 tons. At the end of August 47 blast furnaces were in operation and six idle, against 44 in blast and six out of blast on August 31, 1911.

One of the Andrews & Hitchcock Iron Company's blast furnaces at Hubbard, Ohio, is being relined. It is expected to resume about December 1.

Fagoted Iron, Busheled Iron and Knobbled Charcoal Iron

George Schuhmann, general manager Reading Iron Company, has recently added a brief chapter to the leaflet he issued in 1906 giving a résumé of iron and steel processes. The new chapter deals with "Fagoted Iron, Busheled Iron and Knobbled Charcoal Iron." As it presents in condensed form the essential facts concerning the methods of producing irons of these descriptions we reproduce it below:

1. *Fagoted Iron.*—This is produced by piling up pieces of wrought-iron scrap, such as bolts, bars, structural material, etc., in a box-like shape, using either old boiler plate or new muck bar as sides and covers. These so-called "box-piles" are then put into a heating furnace, heated to a welding heat, and then either rolled into the shape of the product desired direct or rolled first into billets and then reheated and rerolled into the finished product. When the scrap used is strictly wrought iron the finished bars so made are of a good quality, showing a higher ductility than those made from ordinary muck bars, but, unfortunately, it is a difficult matter to get strictly wrought-iron scrap without an admixture of steel scrap, and while the mixed-in soft steel does not reduce the strength or ductility of the metal, it reduces its resistance against corrosion and therefore it should never be used in the manufacture of material exposed to corrosive influences, such as corrugated iron sheets, pipes, etc.

2. *Busheled Iron.*—Busheled iron is made by taking miscellaneous junk-yard scrap (generally small pieces), sometimes mixed with iron and steel turnings, swarf, etc., and heating it to a welding heat in a furnace similar to a puddling furnace, then forming it into lumps similar to a puddle ball, running it through a squeezer to form an elongated round bloom. This is then rolled out into muck bars, which are afterward cut up, piled on top of one another, heated to a welding heat and then rolled out into the desired finished product. Owing to the irregular composition of the scrap, which is often mixed with high carbon and other alloy steels, the material so produced is very unreliable as to its physical qualities and should never be used where either strength or longevity is an object.

3. *Knobbled Charcoal Iron.*—As explained in the chapter on "Charcoal Iron," in the monograph "Iron and Steel," there are two grades of charcoal wrought iron. The first is made from charcoal pig iron and the other from wrought iron or soft steel scrap. (Practically all the charcoal wrought iron made in this country is made by the last-named method.) While both steel and wrought iron are used in the latter process, the subsequent manipulation is entirely different from the fagoting or busheling processes described above, in which cases the different pieces of scrap retain their individuality in the pile and are stretched out in rolling, while in the knobbling fire the scrap is melted down drop by drop, so that each drop as it sinks into the mass of cinder at the bottom of the fire is coated with cinder similar to the coating of cinder on the iron globules in the puddling furnace. In other words, the metal returns to its original state and forms an entirely different structure from the iron that has been produced by simply heating the scrap to a welding heat and then rolling it out. Because busheled iron is of such an unreliable quality and is the cheapest rolled iron that can be produced at the present time, its shortcomings have been used by the champions of steel as an argument against charcoal iron, by claiming that both processes are practically the same. Busheled wrought iron is a conglomerate of small pieces of iron and steel of different grades, while the iron produced in the knobbling fire is resolved into its original state, so as to cover each drop of iron with its coating of cinder. The lumps produced in the knobbling fire are forged under a steam hammer, then rolled into bars which are repiled, reheated and rerolled, thus producing a metal of high ductility and uniformity and at the same time retaining the rust-resisting cinder films the same as wrought iron made from puddled pig iron.

The Empire Steel & Iron Company, Catasauqua, Pa., has decided to put its Macungie, Pa., furnace in blast at as early a date as possible to take the place of the Crane stack, which was blown out recently for repairs.

The Machine Tool Export Trade

Machine Tool Builders' Convention Considers Important Papers by W. A. Viall, Providence, R. I., and Stanley H. Bullard, Bridgeport, Conn.

The discussion of the question of the development of the export trade in American machine tools played a conspicuous part in the convention of the National Machine Tool Builders' Association last week. W. A. Viall, Brown & Sharpe Mfg. Company, Providence, R. I., read a paper on the general subject, and was followed by Stanley H. Bullard, Bullard Machine Tool Company, Bridgeport, Conn., who favored the preparation of an association catalogue in several languages. Mr. Bullard's recommendation was referred to a committee. The papers were as follows:

The Machine Tool Export Trade

BY W. A. VIALL

In no line of exports has the American spirit of ingenuity and of invention shown greater than in the machine tool line. It is a field in which our conditions of labor made it necessary to cut straight lines through many of the older ways of doing business and inventing machines to take the place of hand workmen. Machine tools were being built in foreign countries as well as in our own, and following the Civil War there was a particular growth in machine design that developed more and more, and in 1876 the Centennial Exhibition at Philadelphia showed something of this new line of work. Up to this time a few of the manufacturers had been exporting in a quiet kind of way, had done a good deal of business and had earned for American tools a reputation that was a desirable one.

The Great Showing of Machinery at Chicago in 1893

Greater developments in design came about, until 17 years later, at Chicago, we had that magnificent showing of machinery that was instructive to ourselves as well as to the foreigner. Foreigners came in great numbers. The best of the engineering ability not only visited the exhibition, but visited our shops and were received with open arms. Progress had been made in foreign countries, but not to the extent that was shown in America, and after the exhibition we had a trade that many of us will never forget. Be it said to the honor of the machine tool builders most of the material that went abroad was material that stood upon its merits and added to the reputation that our tools had already attained abroad. There were unfortunately some cases where unprincipled advantage was taken of the opportunity, but the great majority of the manufacturers seemed to appreciate the fact that the opportunity was not to be overlooked.

Since that time our foreign friends have no more stood still than have we, and in the reports obtained from those who visit the foreign markets to study conditions we get confirmation of what we see with our own eyes when visiting—that designs are constantly improving; that workmanship is approaching that which we furnish from this side. That we are copied to a greater or less extent may be sincere flattery, and while we can accept as a fact that copies can be but second best, it is dangerous from a commercial standpoint, for the reason that many are persuaded that the copy is as good, and the lower figure that can be placed upon its manufacture, by reason of the elimination of its designing and experimental costs, to say nothing of difference in wages, adds to the difficulties in competition.

No Country Should Have the Whole Business

Neither our own nor any other country can or should have all of the business in machine tools. As our lines develop, there is no question that one foreign country may excel another and ourselves in a given line of development, and when such a fact is realized we should be as open-minded and as ready to purchase as we are to desire others to consider and purchase from us.

As a people, we sometimes pride ourselves on our business spirit of push and get there. So much have we talked about it that some of our foreign competitors have become so impressed by the fact they call us not only aggressive but egotistical, tricky and even brutal in competition.

We admit we try to be aggressive, denying the remaining allegations as being too strong, but when we study the methods of some of our foreign competitors in working for export trade we wonder if we are aggressive even, and our wonder increases as we compare foreign export figures with our own. Are we inspired with the possibilities before us, and willing to add perspiration to inspiration?

Peculiarities of Export Business

Export business is not different from any other business in its principles. In our domestic trade there is no lathe nor milling machine tool builder who does not take such steps to sell his goods as will cause them to be purchased rather than the goods of a competing lathe or milling machine manufacturer. In such a case the manufacturer studies the market, and does what he considers is necessary to interest the prospective customer and to take the order.

In export business, instead of dealing with a neighbor who lives within a shorter or longer distance from us, speaking the same language and living in the same general atmosphere of business and social conditions, we are dealing with a competitor who, except in the case of the English, speaks another language and all of whom live under conditions of life and are inheritors of business principles and methods that differ from ours.

What do we do to get domestic business? We try to get designs that are satisfactory, designs for which there is or for which there can be secured a demand. We try to offer workmanship that is of a high order, and if we are dealing with competitors who have equally good designs and equally good workmanship, we sometimes feel that by manufacturing more cheaply we can sell more cheaply and thus obtain a market.

To sell goods abroad there are different courses open. The sales can be effected through agents who will act as your representatives, through direct travelers or through general agents who are but little more than commission merchants.

Selling Through Representatives

There are representatives and representatives. If you sell through a representative, and can obtain to handle your product a concern that is thoroughly in sympathy with you, will work for your interests, will represent you and you alone in your line, you then are in a position to reciprocate and work for him. Such a representative must be taken into your confidence; you must listen to his requirements, and while it is by no means possible to grant all of the requests that he makes, it is possible to get from him a point of view of a character that will help you in obtaining a share of the business that you are seeking.

While selling through such a representative you are dealing with a concern the staff of which know the people with whom they deal, know their peculiarities, and can more readily make a trade than through a direct representative. To think of sending a direct representative who cannot speak the language is so far from anything that any of us would think of doing it is hardly necessary to discuss this feature of the question. But, given one who understands the language, as a direct representative he has to meet conditions that it is not easy for home people to understand, so that it almost precludes this form of representation. When, however, you second the efforts of your representing agents with the services of a direct representative, results are oftentimes then obtained that make such services an imperative necessity. This element is one that cannot call forth positive rules. If your machine is a type of special machinery, the need

is far greater than when it is a type of standard machinery, and where to draw the line is a matter of private opinion.

Communication with Representatives

When goods are sold abroad through representatives it is an imperative necessity that the house selling should have first-hand knowledge of conditions existing in its foreign trade. Your agents will write until they are black in the face and get no response from you, when, did you but know a little of what they are contending with, one letter would have sufficed to have placed matters in order.

From personal visiting we will have something of an idea of what it means to have our literature in the language of the people that are to use the goods. We spend large amounts of money on our domestic business, on circulars and all other manner of printed material, but are apt to hesitate at printing in a foreign language when we are looking for the export business.

This brings up the matter of correspondence. Are we as apt to be as prompt in answering our foreign correspondents as we are our domestic friends, especially if they are not more than a 100 or 200 miles away? Are we not a little apt to think, "Well, he has been waiting for ten days, a day or two will make no difference," rather than to think, "He has been waiting for ten days and how tedious it must be to have to wait another ten days, therefore this letter will be answered ahead of our New York letter." As a general rule, do we watch the sailings of the mail ships as closely as the foreigner, and attempt to make certain that given letters and documents reach New York in time to make the best connections?

Attitude Toward Foreign Trade

Have not some of us felt the export business was a splendid thing in bad times but a nuisance in good times? Have we not been rather apt to give, not a just delivery, to our foreign friend, but to give him the delivery that was left over after our domestic friends were taken care of? When we are called upon to put up some special form of packing to meet certain conditions, do we not feel that our representative is perhaps a little overparticular, if not cranky, and make him feel that what is good enough for us is good enough for him, rather than to attempt to judiciously follow his wishes? Do we visit our representatives or have them visit us so often that we can talk over the things that are going on and become more closely allied? If we do, we are backing up our representatives as thoroughly as we are backing our own salesman on our own ground, and when we do not we are playing with our foreign business.

The United States is not the only country that has customs regulations. We find that foreigners take the utmost pains to conform to our American customs requirements when exporting goods to this country, but when we export to their country are we not rather apt to consider it more or less of a nuisance to carry out in detail the requirements of that country and work halfheartedly, with the result that the receiver of our goods abroad is put to such trouble that he will prefer to buy from the foreigner who meets him rather than from the American who holds off?

Foreign Manufacturers Give Precedence to Export Business

In the case of a foreigner, we find that he goes into neutral territory, and we are informed that he will give precedence to the foreign over the domestic business. While this may be hard on his domestic customer, yet there is a national feeling at times that makes them think that they can handle their home trade rather differently from their foreign trade, to the advantage of their home trade, on the theory that they are building up their nation. Our country has not been noted, in the machine tool business at least, as being willing to use foreign countries as dumping grounds of our manufactures in the way of prices, charging all of the overhead to domestic business and figuring the prices of the export at flat labor cost without overhead, but this is a thing that we are meeting in competition in foreign markets.

Wages are an important element in cost, but they are not standing still abroad. There are those who want to see lower tariffs, which will mean lower cost of living and lower wages, and then perhaps there will be a competition that will be carried forward on a basis we have not yet been able to attain, and many of us hope we shall not attain.

Difficulties Confronting American Builders

We have one difficulty in getting into European markets that our European competitors do not have, in that we have a great distance to travel, and this oftentimes prevents our sending men and lessens the number of visitors—conditions which do not prevail among European manufacturers. When the South American and the Far East markets are considered, however, then they have as far to go as we have.

Many of us are of English descent and have inherited some of the English traits. The matter of language is one of them. How often we hear the American saying that the English language is good enough for him and let the other fellow learn English. When we go abroad we find people that are speaking English up and down the line. Most of us are acquainted with the young men who come to America for the main purpose of learning English (and, incidentally, to learn some of our methods), and then in turn become the men who are doing business. A knowledge of foreign languages is not an absolute necessity for the export business, but it is certainly one of the advantages that those have who possess it, and this is a bit of practice, at the hands of our competitors, we could well bear in mind and consider if it would not pay if more of our young men were sent over, if for nothing more than to acquire one or two of the languages of countries where we want to do business.

If we follow closely some of the literature of other countries, we find some of them are hanging together with a spirit of co-operation that is not always evident in our own country. One of the purposes of our association is to draw together manufacturers so that we can act as a whole, as a body of American manufacturers rather than as individuals—and results have already appeared in this direction.

When we contemplate that in the year 1911 the United States exported to Italy, in metal and wood-working machinery, 1,000,000 kilograms and Germany 6,000,000 kilograms; in 1910 we exported machinery to Switzerland to the extent of 500,000 francs and Germany 4,000,000 francs, and in 1909 we exported to France machinery to the extent of 45,000,000 francs and Germany 110,000,000 francs, it is quite time that we carried into effect as individuals and, when necessary, as an association, that attention to the details, to the necessities and to the desires of the foreign customer that we are giving to our domestic customer every day, and think it but a part of the day's work when we do it.

Considering the above figures, it goes without saying that we must constantly maintain the highest standard of design and workmanship. But beyond this, what is the matter with our American export trade? Are our goods not fitted to the foreign market, or are they not properly presented to the buyer, or are the prices too high?

An Association Catalogue in Foreign Trade

BY STANLEY H. BULLARD

In the final analysis foreign trade is not so vastly different from domestic trade. Success in either field is the result of well-directed effort and the intelligent employment of every selling force at our command. Personal representation is without doubt the strongest selling force, but as this is a practical impossibility in every case, owing to the question of expense, we are forced to rely largely on printed representation, or advertising, in its various forms.

Attention Always Called to Catalogues

Advertising in the trade journals with their large specialized circulation, offers an efficient means of arousing interest and permits us to present, in a limited way, the arguments in favor of our propositions, but somewhere in every advertisement will be found an offer to send to those interested more detailed information in the form of a catalogue. In the preparation of these catalogues we have put forth our best efforts, sparing no expense with-

in reason to make them not only attractive, but as strong in selling power as is possible with the free use of detailed illustrations and well written descriptive matter.

Being, as a rule, specialists in manufacture, our books deal with but one subject and in fact are not catalogues. The real catalogue, covering the wide range of information which is required by the modern shop executive is not developed until the books which we, as individuals, have sent out are filed and indexed in their proper order and relation.

In America there seems to be a willingness to so preserve the mass of printed matter sent out annually by the various manufacturers, and elaborate schemes have been developed here in order that immediate use may be made of all information at hand which has reference to any particular subject under consideration. This appreciation of the value of the manufacturers' printed arguments is not evident in the foreign field, very few concerns abroad having taken steps to preserve for future use anything but the largest and most pretentious volumes, which are in reality catalogues.

American Machine Tool Catalogues are Thin

Being specialists, our books are comparatively thin, seldom exceeding one-half in. in thickness and generally having a thickness of less than one-quarter in., while ranging in size from 4 x 6 in. to 9 x 12 in., with no standard as to shape or form. All this tends to make their preservation a real difficulty, and by so doing places us at a decided disadvantage in comparison with our foreign competitors, who, not being specialists, compile books of many pages covering everything which they have ever made, supplemented with page after page of offers to still further modify their designs to meet the customer's requirements. Thus a heavy volume is produced which will not easily become misplaced, and because of its size and the wide range of machines described is preserved and referred to whenever its recipient has under consideration the installation of further equipment. Granting that our system is efficient in the home field, it will readily be seen that there is opportunity for great improvement in our methods when the foreign field is taken into consideration.

The highly efficient personal presentation of our arguments is practically out of the question, and we are, therefore, even to a greater extent than at home, dependent on our printed salesmen, which have been shown to be remarkably inefficient. Our very system of manufacture makes it impossible for us to individually cope with the situation and make our printed matter self-preservative and therefore of highest value, not only to ourselves, but to our prospective customers in the foreign field.

Combined Effort Offers a Solution

A solution of the difficulty lies, however, in the fact that we are associated, and that what is out of the question for each of us as individuals is, through a combination of effort, easily made possible. The National Machine Tool Builders' Association, thanks to the highly efficient management which it has enjoyed since its inception, represents a large majority of the machine tool industry in America. Its work has been of tremendous importance to that industry as a whole, but it has so far refrained from taking concerted action on the problems having to do with the disposition of the product of its members, confining itself, and properly so, to the study of questions bearing on the development of skilled labor through the apprenticeship system, the standardization of cost systems, the compilation of statistics of foreign and domestic trade, the standardization of parts and the solution of other problems which are of equal importance in business and shop management. Above all else in importance has been the development, through association, of a better understanding between the members and a willingness to co-operate in any movement which has for its ultimate object the betterment of the industry.

The Scheme of an Association Catalogue

Your present board of officers, in considering various objects which would properly come within the scope of the association in its endeavor to be of still greater service to its members, took up the question of the development of foreign trade, and conceived the idea of an association catalogue. Such a book would indeed be a true catalogue. It would cover practically everything in the operation of a modern machine shop, no matter for what purpose of manufacture that shop was being erected, as not only are all types of machine tools manufactured by our membership, but the different types are made in several classes, such as light, medium and heavy. The catalogue would prove a veritable mine of information for shop executives the world over, and would be looked upon by prospective purchasers of equipment as an authoritative work upon the subject because of the prestige which already is connected with the name of our association.

How Such a Catalogue Would Stimulate Trade

While prophecy is an easy matter, anyone being entitled to a guess, it is not idle to suggest that our foreign trade in machine tools would be increased appreciably as soon as such a catalogue were distributed, the volume of trade growing greater and greater as the distribution became more complete and the use of the catalogue more general. American machine tool builders would, through the association, be placed in this line of manufacture, and so great would be the volume of inquiry addressed directly to the association's offices that the establishment of a department partaking of the nature of a clearing-house might become necessary. The work of this department would consist of transmitting to all members interested such inquiries as might be received for the different classes and types of tools listed and eventually might develop into a credit-inquiry bureau as well.

But let us return to a consideration of the catalogue itself. Such a book as has been suggested would consist of a series of divisions or sections, each devoted to a particular type of machine, these divisions being again divided into the various classifications of each type. Representations therein would be limited to a page in each division or sub-division for each manufacturer of the class of tools shown therein, this plan being suggested in order that there might be no chance of a small concern being overshadowed by a larger and more wealthy co-advertiser.

In order that the catalogue shall conform in every way to existing standards for publications of this nature, it is suggested that it be gotten out in the 9 x 12-in. size, which would permit of a type page 7 x 10 in., a size amply large for cut and tabulated data pertaining thereto, as well as the name and address of the member advertising. While it is realized that in some cases the one-page limit would so reduce the size of illustrations as to seriously detract from the effect of true size and proportion, the arts of illustrating and printing are so far advanced that practically nothing would be lost in detail.

The Catalogue Size Based on the Segregated List

Analyzing the recently issued Segregated List of manufactures and membership, it is found that, with a total of 176 members there are 19 distinct types of machines manufactured, which in turn are sub-divided into 98 different classifications, and if each concern were represented by one page for each type and class under which it is listed a catalogue of 553 pages would be required to represent the industry. It is notable, however, that in the Segregated List there are many cases of what might be termed an attempt to cross-index, the same tool in some cases being listed under three and sometimes four headings. Such being the case, the number of pages required would be materially reduced and without attempting to re-classify the entire list, an arbitrary reduction of a trifle over 25 per cent. was made, bringing the total number of pages required to approximately 400.

Cost of Printing

On this basis tentative figures were obtained for printing a total of 25,000 copies—10,000 in English and 5000 each in German, French and Spanish. Figures submitted indicate an approximate cost of $125 per page, including the cost of cuts, the cost of compilation and translation not being included. It is estimated, however, that these items would not exceed $10 per page, thus bringing the total cost per page to $135, or $55,000 the total cost for the entire edition. The final decision as to the exact number of books required and the proportion of the total which should be printed in the different commercial languages can be reached only after a very exhaustive study

of the export trade statistics for a number of years back and from which a true indication of the market tendency, which would serve as an invaluable guide, can also be obtained.

The Distribution of the Catalogue

The question of distribution is of decided importance, but such lists as are now in the hands of our members, supplemented by the information obtainable from the Bureau of Commerce at Washington, should enable us to place a large number of catalogues in the hands of those most directly interested and from whom we could expect almost immediate direct returns in the way of increased business.

In the hands of the United States consuls located in those cities which are centers of manufacture, such a catalogue would be referred to constantly, with the inevitable result that new names would be continually added to our lists by the direct inquiries which would result from such use, and if it was felt that a still broader distribution was desirable, recourse could be taken to the advertising pages of the various technical journals and a more widespread interest could be thus aroused.

That a catalogue of this nature would prove of inestimable advantage, not only to the association as a whole, but to the individual members thereof, will be admitted without question, and it is earnestly recommended that the proposition be given serious consideration with a view of adding to the common good.

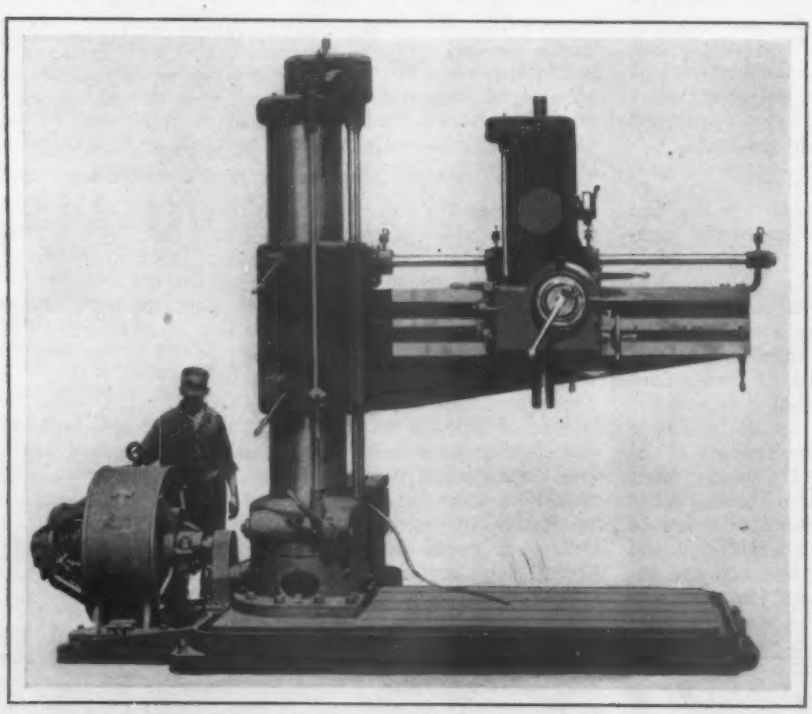
Motor-Driven Radial Drilling Machine

A high-speed, high-power plain radial drilling machine which is directly driven by an adjustable-speed electric motor has been developed by the Cincinnati Bickford Machine Tool Company, Cincinnati, Ohio, and the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. The tool is nominally rated as a 6-ft. radial drilling machine, but the arm and base can be shortened or lengthened as may be desired. It is designed for continuous drilling from the solid in either cast iron or steel of holes up to a maximum diameter of 3 in. at the speeds and feeds which are now recommended by the manufacturers of high-speed drills. The motor is especially adapted for adjustable-speed machine tool drive.

The arm of the drill is of box section, and is reinforced by ribbing. Its design is such that it automatically trips at the top and bottom of its travel to guard against accident, and it is lowered at twice its elevating speed. In the design of the arm care has been taken to balance it so that but little effort, it is emphasized, is necessary to swing it around the column. The depth gauge which forms a part of the quick return head and also acts as an automatic trip is graduated to read from zero to 7 in. in either sixteenths or millimeters without resetting. This is an advantage, as the tool can be used in places where the metric standard has been adopted without necessitating any changes in design. Ten feed changes ranging from 0.008 to 0.040 in. per revolution of the spindle are provided, any one of which is instantly secured by a lever-operated dive key. The feeding mechanism is inclosed in the head and is fitted with a ball thrust bearing. There are 20 spindle speeds available and any one of these can be obtained while the machine is running. A single lever on the speed box provides for five changes, the ratio between the fastest and the slowest being only 1.7 to 1.

The base of the machine has an extension for a table and contains the reservoir and channels for the use of a lubricant. If desired a pump and the necessary accessories for delivering lubricant to the point of the drill can also be furnished. Bronze bushings are used throughout the machine for the bearings and all the important ones have adjustable sight-feed oilers.

The motor, which is especially adapted for adjustable-speed machine tool drive and other service where the load is frequently started, stopped and reversed, has a capacity of 20 hp., and is designed for operation on a 230-volt direct-current circuit with a speed range of 2 to 1. It is mounted on an extension of the bed and transmits its power to the drill point by nickel steel gears. It has commutating poles which insure practically sparkless commutation under all loads and at any speed within the range for which it was designed. The bearings, which have a liberal area, are dust-proof, and are amply lubricated whenever the motor operates, but it is pointed out that no oil can escape from them.



A High Speed High Power Plain Radial Drilling Machine with Westinghouse Adjustable-Speed Motor Drive Built by the Cincinnati Bickford Machine Tool Company, Cincinnati, Ohio

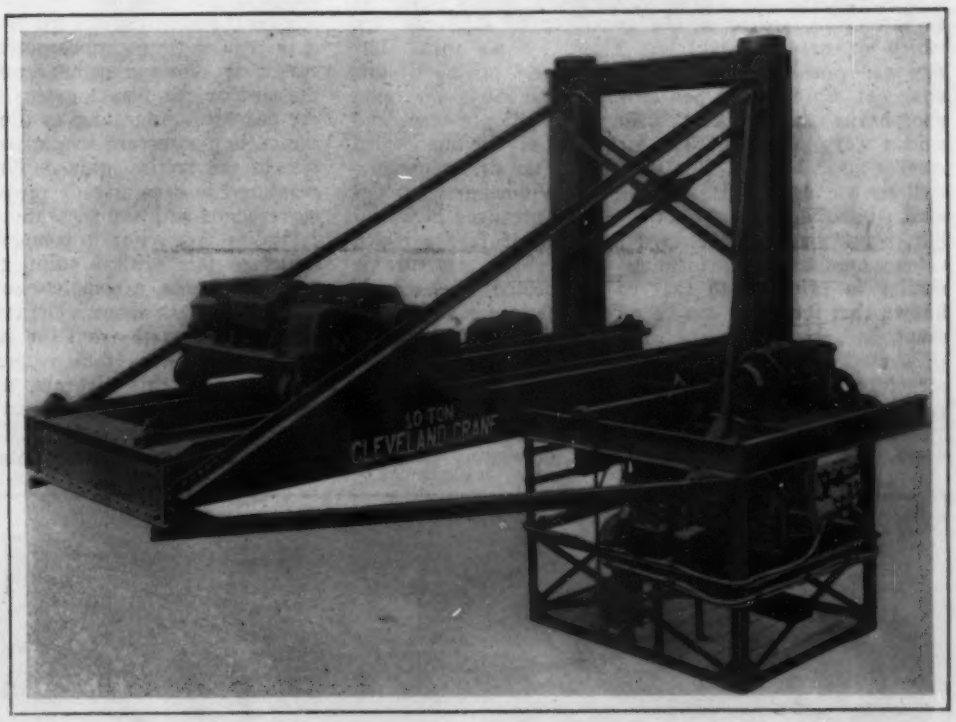
Meter for the Cochrane Heater Described

What the company regards as a cash register for the coal pile is the Cochrane combined feed water heater and meter, described in an engineering leaflet issued by the Harrison Safety Boiler Works, North Philadelphia. The meter itself is a simple V-notched weir and by its incorporation in the construction of an open feed-water heater, advantage is taken of the fact that all boiler feed supplies, including the raw make-up water and the returns, discharges from traps, etc., are brought together in the heater prior to being fed to the boiler. The reason for selecting a V-shaped notch instead of a rectangular notch is that when the quantity of water flowing is small the flow is confined to a small space. This principle is based on investigations made by Dr. James Thompson, professor of civil engineering at Queen's College, Belfast, and at Glasgow University. The rate of flow is recorded by means of a large float, which operates a mechanical recording gear. The record shows the instantaneous rate of flow at any moment during the period covered, and by integrating the area of the chart the total flow may be obtained. An automatic integrator, it is explained, may also be added. The performance of triangular notched weirs mounted in chambers of the proper size is described in the publication and an accuracy of the meters within 1½ per cent. of absolute accuracy by weight is reported.

Control of the Art Metal Construction Company, Jamestown, N. Y., owned by George D. Barnard and others of St. Louis, Mo., has been sold to a syndicate headed by Clayton E. Bailey of Jamestown. The company makes steel office filing cases and other devices, and the deal is said to represent a transaction of about $1,000,000.

New Cage-Operated Traveling Wall Crane

A new type of cage-operated electric traveling wall crane has recently been brought out by the Cleveland Crane & Engineering Company, Wickliffe, Ohio. This crane, two of which have been recently installed in the plant of the Buckeye Steel Castings Company, Columbus, Ohio, has a capacity of 10 tons and is composed of two main parts, the bridge proper and the trolley. The mast section of the bridge is built up of channels and structural material, well tied together so as to provide a strong, rigid construction for the bridge traveling machinery, and also to support the I-beam girders running at right angles from the mast, on which the trolley is supported. These girders are further braced to the top of the mast of the crane by angle straps. The ends of the I-beam girders are securely fastened together by a boxlike construction of structural material.



A New Cage-Operated Traveling Electric Wall Crane Built by the Cleveland Crane & Engineering Company, Wickliffe, Ohio

The trolley used for this crane is of the builder's regular two-motor type and is of the same design as that used on the company's standard overhead electric traveling cranes. It is made up of two cast-iron side frames supported on four wheels having M. C. B. truck bearings. These side frames, together with the tie pieces and plate sections, form a base for the hoisting and racking machinery, which consists of standard drums, grooved both right and left for wire rope, and the motor and the necessary gearing for the hoisting movement. The trolley is moved back and forth on its runway through its 20-ft. travel by a motor which is geared to one of the trolley truck shafts, and it has one of the company's standard bottom blocks.

The cage, which is furnished with the crane, contains the controlling apparatus, together with the switchboard and its accessories, and also provides ample room for the operator. It is attached to the girders in such a way as not to interfere with the full cross travel of the trolley. The crane runs on and against a special track which will be generally placed under an overhead traveling crane. The weight of the crane and its load is supported by a track attached to the wall. At the top of the mast of the crane, as well as at the lowest point of the mast, there are flat tread flangeless horizontal wheels that run against other tracks.

An important feature of this type of crane is that the bridge is driven by two motors instead of one. A motor is geared to each perpendicular track wheel through two reduction gears. One of these wheels is shown to the right of the gearing near the motor. This makes a very direct connection for the travel of the crane and also eliminates the use of a through lineshaft, thus reducing the number of parts of machinery.

This type of crane is designed particularly for use under overhead traveling cranes, and especially where the building is of great length, thus permitting the crane to cover a considerable amount of floor space. Its three movements make it very flexible as to service.

Trade of the United States with its non-contiguous territories will amount to $250,000,000 in 1912. The gain in trade with these territories has been at a rate far greater than that with foreign countries. Figures of 1912 will exceed by 150 per cent. those of a decade ago, while the trade with foreign countries for same periods shows a gain of approximately 75 per cent.

Compensation Acts and the Automatic Sprinkler

Where workmen's compensation acts have been enacted every death from fire and every bodily injury from fire to an industrial workman means that the employer must pay compensation. All compensation insurance underwriters recognize this fact and regard it as a serious menace to the surplus of their companies. As far as present records show, there have been to date just eight deaths by fire in properties protected by automatic sprinklers. Five of these were in one fire in a building where the water had been turned off from the sprinklers. The employees were suffocated by a quick fire before water could again be turned into the system. Two deaths occurred in a celluloid factory where the fire was completely put out by the sprinklers after the unfortunate employees had run through the flames. The other case was the explosion of a lantern in the hands of a watchman. His death resulted, but the sprinklers held the fire and prevented the destruction of the building. In none of these cases was the automatic sprinkler at fault. In other words, its record as a fire-fighting and life-saving device is perfectly clear.

A Purifying Alloy to Get Good German Silver Castings

Very good castings of german silver, which is a composition of nickel, copper and zinc, have been secured by adding 4 oz. of cupro-nickel-vanadium to the molten bath, just about 5 min. before the heat is ready to pour. This point was brought out by C. Powell Karr, metallurgist Standard Chemical Company, Pittsburgh, Pa., in a paper before the American Institute of Metals. The best procedure, he says, is to have the cupro-nickel-vanadium either in a granulated form or broken into small pieces, wrapped in a piece of paper so as to keep the mass together, allow the little heap to become bright cherry red, and then push it down below the surface, and hold it there, with an inverted cupped disc, the handle to which is about 4 ft. long. The mass is held down near the bottom of the pot until it is completely absorbed by the charge. Then one should gently stir with a pumping motion, and allow the charge to remain quietly for about 5 min., so as to give the vanadium a proper chance to perform its scouring and purifying action. The vanadium exerts no deleterious action upon the texture of the crucible. When the metal reaches a clear, limpid state, as evidenced by its greater mobility, the heat is ready to pour. Lambent flames of zinc oxide fare up when the metal is in a perfect condition.

The Annealing of Steel Castings

Temperature at Which the Casting Structure Disappears—Improvement in Physical Properties Caused by Heat Treatment

Dr. P. Oberhoffer, Breslau, Germany, is the author of an interesting article on the annealing of steel castings, which appeared in Stahl und Eisen, No. 22, 1912. The first experiments were made with a steel casting of this analysis: Carbon 0.27 per cent., sulphur 0.032 per cent., phosphorus 0.040 per cent., manganese 0.88 per cent., and silicon 0.275 per cent. The structure of the unannealed steel is given in Figs. 1 to 3, of which the first shows the well-known martensitic structure or Widmannstätten figures, while the others show the pearlite arranged in worm-like, wavy masses, penetrated by veins of ferrite which often come together, forming cells. This structure is similar in principle to that of overheated steel. It is known that the latter can be refined by proper heat treatment, and this is also the case with the coarse structure of a steel casting. In order to examine the changes in structure brought about by annealing, samples of the steel mentioned above were heated for three hours to 750, 800, 850, 900 and 1000 deg. C., and slowly cooled. Only after heating to 850 deg. does the casting structure disappear, as is shown in Fig. 4, where the ferrite grains possess the same dimensions in all directions. The pearlite is in regular aggregations, although for some unexplained reason it shows a cellular structure. Beyond 850 deg. the size of the ferrite grains increases, and also that of the pearlite. Annealing at 850 deg. C., therefore, causes the casting structure to disappear and gives the smallest size to the ferrite grains. The importance of this temperature has been already recognized by W. Campbell. It corresponds with the separation of the ferrite at the critical point Ac_3. For a complete removal of the casting structure this critical point must be slightly exceeded. In other words, a complete solid solution of the carbide must be brought about. The temperatures at which ferrite begins to separate from the solid solution are shown in Diagram 1, taken from a paper by Goerens and Meyer. According to this diagram, a steel with 0.27 per cent. carbon must be heated at least to 890 deg. C. The tests, however, show that 850 deg. C. is sufficient. The reason for this difference is most probably the manganese present.

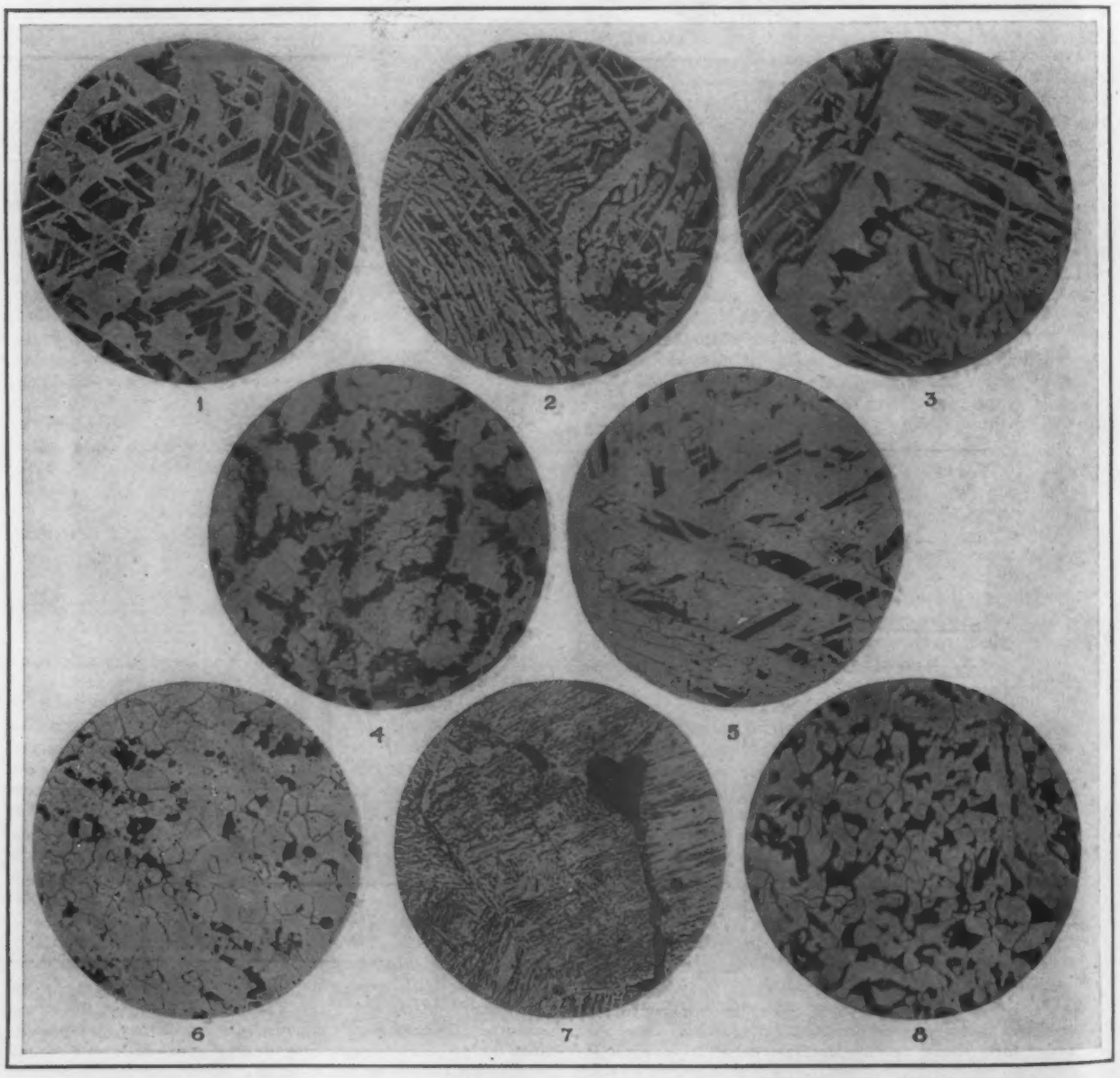


Fig. 1—Casting Structure, 0.27 Per Cent Carbon. Fig. 2—Casting Structure, 0.27 Per Cent Carbon. Fig. 3—Casting Structure, 0.27 Per Cent Carbon. Fig. 4—Structure After Annealing at 850 Deg. C., 0.27 Per Cent Carbon. Fig. 5—Casting Structure, 0.11 Per Cent Carbon. Fig. 6—Structure After Annealing at 890 Deg. C., 0.11 Per Cent Carbon. Fig. 7—Inclusions of MnS Between the Crystals. Quenched from 1450 Deg. C. Carbon Content, 0.27 Per Cent. Fig. 8—Sulphide of Manganese Cells.

The sample used by Goerens and Meyer contained only 0.25 per cent. Mn., while the present sample contains 0.88 per cent., an increased amount of 0.63 per cent. From the tests made by Osmond and Guillet, 1 per cent. Mn. lowers the upper critical point by about 70 deg. C., so that 0.63 per cent. will lower it about 44 deg. C. The necessary theoretical temperature will therefore be 890 — 44 = 846 deg. C. This value agrees well with that obtained in practice, namely, 850 deg. C.

Changes in Physical Properties

In addition to the structure, the physical properties of the steel are changed. While forged steel usually shows a decrease in tenacity with annealing, but an increase in ductility, a steel casting generally shows a double improvement, for both ductility and tenacity are increased. The results of tensile tests on samples 500 x 300 x 35 mm. (19.7 x 11.8 x 1.38 in.) are shown in Table 1:

TABLE 1.—TENSILE TESTS.

Annealing temp.	Grain size of ferrite cmm.	Elas. limit lb. per sq. in.	Ult. stress lb. per sq. in	Elong. per cent.	Red. area per cent.
Unannealed	7.5 x 10.5	32700	67300	14.6	17.0
750 deg. C.	3.3 "	32000	66700	8.1	14.2
800	1.8 "	34100	70260	20.7	28.2
850	1.4 "	39800	72960	22.5	29.7
900	7.3 "	38400	72700	20.0	26.7
1,000	18.1 "	37000	74100	14.0	20.4

The results show clearly the double improvement that has been brought about. The best combination of tenacity is obtained with an annealing at 850 deg., i.e., when the casting structure disappears and the grain size of the ferrite is the smallest. The results also show that to obtain the best results the steel must be heated to a temperature just above that at which the separation of ferrite begins, and until all the distinguishing features of the casting structure disappear. In order to determine exactly the most suitable temperature in separate cases a series of experiments should be made. The intervals between the annealing temperatures experimented with should be narrow—20 to 30 deg. C.—and further properties should be considered, such as hardness, resistance of nickel test pieces to shock, solubility in dilute acids, and magnetic properties.

Experiments to Determine the Best Annealing Temperature

The following experiments were made with the softest quality of steel generally used for parts of dynamos. The analysis was: 0.11 per cent. carbon, 0.035 per cent. sulphur, 0.03 per cent. phosphorus, 0.60 per cent. manganese, and 0.4 per cent. silicon. The material used was an unannealed piece 230 x 230 mm. (9.05 x 9.05 in.) in section. It was cut up into bars 45 x 45 x 410 mm. (1.77 x 1.77 x 16.14 in.) They were heated for six hours at 770, 800, 830, 860, 890, 920, 950 and 1000 deg. C., and then slowly cooled. The structure of the unannealed steel is shown in Fig. 4. Annealing at temperatures below 890 deg. C. does not remove the casting structure; only on attaining this temperature does it completely disappear, as shown in Fig. 6. Above this temperature the structure does not change in principle, but the ferrite grains become larger. From the diagram we see that with a steel containing 0.11 per cent. carbon (0.25 per cent. manganese) the ferrite separation is at a temperature of 910 deg. C. When the 0.6 per cent. manganese is considered this temperature is 885 deg. C. This agrees well with the temperature found to be actually necessary, namely, 890 deg. C. This kind of calculation, however, can only be taken as approximate, for it is assumed that the manganese acts as if it were present alone; and further the influence of the 0.4 per cent. silicon is neglected. The results of the tensile tests are given in Table 2:

TABLE 2.—TENSILE TESTS

Annealing temp.	Elas. limit, lb. per sq. in.	Ult. stress, lb. per sq. in.	Elong. per cent.	Red. area per cent.
Unannealed	25770	58760	25.9	30.0
770 deg. C.	21490	57460	27.9	51.3
800	25060	58310	28.2	53.5
830	24040	57800	27.8	53.5
860	25370	57800	28.5	56.7
890	33900	59910	28.7	58.8
920	37360	59850	29.9	59.2
950	37020	59620	29.8	55.2
1,000	37260	59740	30.5	55.2

It will be seen that the elastic limit alone shows a considerable increase with the disappearance of the casting structure. The improvement in the material shown by the increase in ultimate stress, elongation and reduction of area from 770 deg. C. upwards, is not important

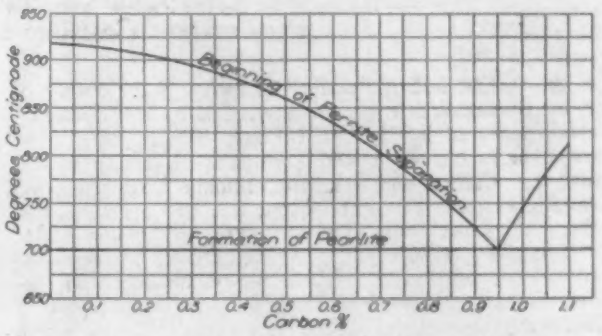


Diagram 1—Temperatures at Which Ferrite Begins to Separate from the Solid Solution

compared with the considerable change in the microstructure. In Table 3 are shown the results of the shock tests on nicked bars.

TABLE 3.—RESULTS OF SHOCK TESTS

Annealing temp.	Specific blow kg. metres per sq. cm.
Unannealed	3.64
770 deg. C.	2.30
800	2.09
830	1.85
860	1.45
890	13.50
920	17.16
950	16.24
1,000	10.33

The specific work of the blow is very small below 890 deg. C., at which temperature the casting structure disappears. At 890 deg., however, it is seen to be almost ten times the value of that at 860 deg. At 920 deg. it reaches its highest value, and above this begins to decrease. From this it is clear that shock tests with nicked bars are an excellent means for characterizing the annealed condition of steel castings. With the disappearance of the casting structure the result of the shock test increases almost by 10, which makes evident the transformation in the internal structure of the steel. It also shows that the reaching of the right temperature is extremely important for such material, which is often exposed to shock. If this temperature is exceeded to an important extent then the result of the shock test decreases, due to an approach to the structure of overheated steel. The fractures of the shock test pieces are shown by means of photographs in the original paper. The results of Brinell hardness tests are given in Table 4.

TABLE 4.—BRINELL HARDNESS TESTS

Annealing temp.	Hardness No.
Unannealed	124.00
770 deg. C.	121.54
800	118.84
830	116.20
860	113.60
890	114.36
920	116.32
950	115.40
1,000	126.84

The hardness result is the lowest from 860 to 950 deg.; that is, from where the casting structure is almost changed. Between these temperatures the results are very close to each other.

Influence of Manganese Sulphide

The influence of the inclusions, chiefly manganese sulphide, on steel castings, is apparently very important. So long as it occurs in small rounded areas it scarcely affects the properties, but it behaves very differently if these areas are more numerous, due to a higher sulphur content, and unite to form cells. These cells separate aggregations of material one from another, and there is very little tenacity between them. The origin of these cells is as follows: The manganese sulphide collects between

the primary crystals, due to its low melting point, and surrounds them with a thin skin. This is shown in Fig. 7, which is a casting containing 0.27 per cent. carbon, 0.8 per cent. manganese, quenched from 1450 deg. C. just below the freezing temperature. The dove-gray manganese sulphide inclusions can be seen between the crystals of martensite. If such a steel is slowly cooled then we have seen that the solid solution decomposes and ferrite separates, beginning at about 845 deg. C. In the process of the ferrite formation the manganese sulphide plays the same part as the strings held in sugar solutions when making the so-called sugar candy. That is, it acts as the nucleus for the ferrite separation. That this is the case is shown by a photograph in the original paper of the same steel quenched 75 deg. C. below the beginning of the ferrite separation. In a dark ground mass of martensite the first ferrite may be seen surrounding the manganese sulphide. So long as this latter substance is present in small amount its influence is for good rather than harm, as it prevents undercooling or surfusion. If, however, it is present in cells, then it causes the separation of ferrite in cells, as may be seen in Fig. 8. Annealing of such material is without influence on the physical properties, for the deciding factor is not now the grain size of the ferrite, but the size of the ball-shaped cells surrounded by brittle and weak sulphide of manganese. In fact, material similar to that shown in Fig. 8 is not improved by annealing. Two photographs are also given of an annealed steel casting, the structure of which is broken up into small aggregations by the presence of much manganese sulphide, due to segregation. They are taken from test pieces which gave very low results, notwithstanding that they were subjected to annealing and at the right temperature.*

Conclusions

From the foregoing the following conclusions may be drawn: 1. The structure of the steel casting may be completely removed and rendered fine-grained by annealing above the temperature where ferrite begins to separate. This temperature is determined by the carbon and manganese present.

2. The disappearance of the casting structure causes an improvement in the tenacity and ductility and a decrease in hardness. In the case examined, that of a very soft steel casting with 0.11 per cent. carbon, the favorable influence of the refining of the structure on the shock test with nicked bars is very striking.

3. Sulphide of manganese in the form of small inclusions is not harmful, but if present in cell formation it completely prevents the favorable influence of heating at the proper annealing temperature. G. B. W.

*Arnold has shown that long continued annealing at a proper temperature will cause this harmful constituent to ball up.—ED.

Motor-Driven Plate Shearing Machine

A new plate gap shearing machine equipped with motor drive has been designed and built by the Niagara Machine & Tool Works, 639 Northland avenue, Buffalo, N. Y. A special feature of this new machine is the adjustment of the back gauge which is attached to the cutter bar. A front view of the machine is given in Fig. 1, while the rear is illustrated in Fig. 2.

The machine is massive in design as is characteristic of the company's large shearing machines, and there are the same conveniences for adjusting the bed, cross-head and gibs. A new feature is the adjustment of the back gauge attached to the cutter bar. The position of this gauge can be quickly regulated by the operator when he stands in front of the machine by manipulating a hand wheel, the motion being transmitted as can be seen in Fig. 2 by three pairs of machine cut bevel gears and two feed screws. The position of the gauge is parallel to the knives at all times.

The machine is driven by a direct-connected 15-hp. motor mounted on a bracket in the rear of the machine, where it is out of the way of the operator. The motion is controlled by a positive clutch which can be started by a foot treadle, and when the cross-head reaches the highest point of its travel it will stop automatically. The hold-down is lowered and raised by two cams keyed to opposite ends of the crankshaft, which is a high-carbon steel forging. The cutting length of the machine is 126 in. Soft steel not exceeding ¼ in. in thickness can be cut by the machine, which weighs about 22,000 lb.

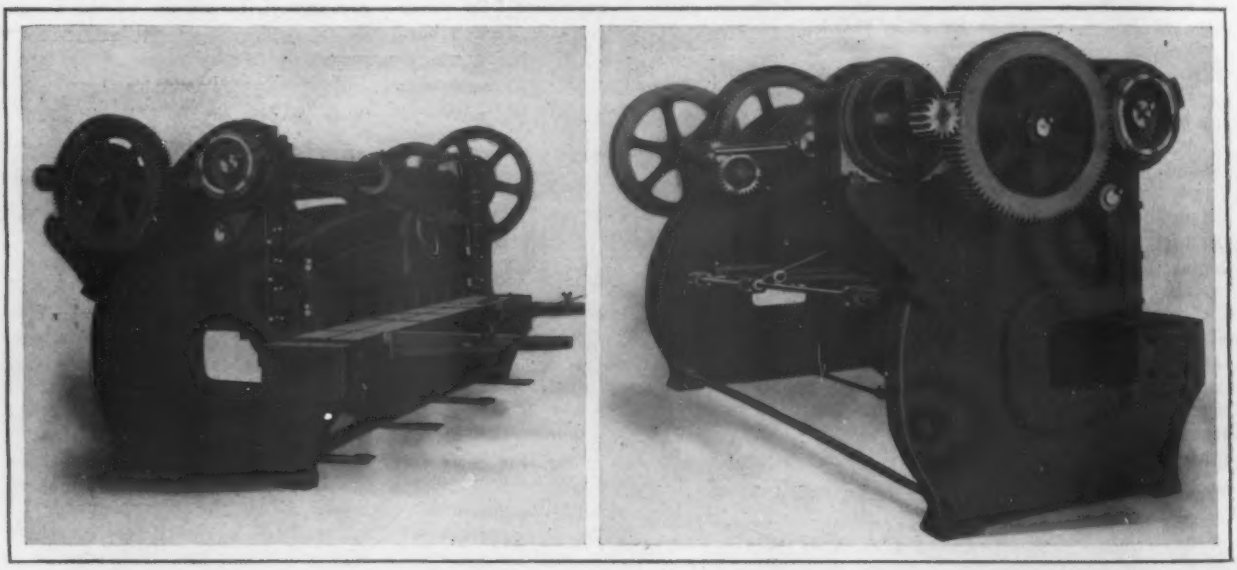


Fig. 1—Front View

Fig. 2—Rear View

Two Views of a New Motor-Driven Plate Gap Shearing Machine Built by the Niagara Machine & Tool Works, Buffalo, N. Y.

The Buffalo Forge Company, Buffalo, N. Y., is experiencing some benefit from the increased buying movement among railroads. Among recent orders received are hot blast heating systems for the Western Maryland Railway, at Hagerstown and Cumberland, Md., where new roundhouses are being erected, similar roundhouse heating equipment for the Erie Railroad, at Galion, Ohio, and Huntington, Ind., and for the Buffalo, Rochester & Pittsburgh, at Du Bois, Pa.

The Ellwood Ivins Tube Works, Oak Lane Station, Philadelphia, Pa., has broken ground for an addition to its office building, which will about double the floor space of the old office. An abundance of orders is reported, with enough ahead to last many months. Facilities in the mills are being enlarged by added furnaces and more machinery. The Ellwood Ivins product in seamless steel tubing is well known throughout the trade for extreme accuracy and high quality.

Both blast furnaces of the Carnegie Steel Company at Columbus, Ohio, are now in operation, the second having been started last week.

A New Plain Radial Drilling Machine

A new line of 3 and 3½-ft. plain radial drilling machines has been placed on the market by the Dreses Machine Tool Company, 227 West McMicken avenue, Cincinnati, Ohio. These tools have been designed for the use of high speed drills and in general appearance resemble the 6-ft. radial drilling machine of this company which was illustrated in *The Iron Age*, October 26, 1911.

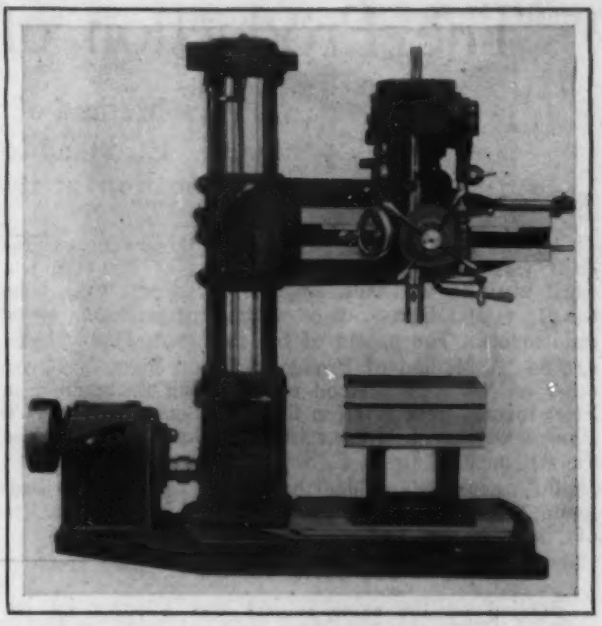
The base is designed on the I-beam principle and is figured to compare in strength and rigidity with the column and the arm. As will be noticed from the accompanying engraving there is a liberal oil groove cast all around the base which drains into a reservoir formed by a pocket on one side. The outer column, which is 10 in. in diameter, swings on a fixed inner one that extends the entire hight of the machine. Both columns are greatly enlarged at the lower end and have a third bearing in the middle, which, it is pointed out, gives strength and rigidity. The reinforced portions provide a means for firm and easy clamping and the clamping handle follows the arm throughout its traverse of 27 in., thus being within easy reach of the operator at all times. The outer column rests on a ball thrust bearing on top of the inner column, an arrangement which insures easy swinging of the arm.

The arm is of box parabolic shape and the lower rib is double webbed to give great resistance to bending and torsional strains. It is lowered and raised by a conveniently located handle and has an automatic knock-out at the top and the bottom. The head has long and wide bearings on the face and in addition there is a third bearing in the rear of the arm which aids to support the head as well as preventing bending and straining of the rear shaft and rapid wear of the bevel gears and their bearings. This bearing also distributes the torsional strain over the entire arm. The clamping and releasing of the head is controlled by one lever placed in front of the operator while a spiral gear arrangement enables the head to be moved easily on the arm. The traverse of the head on the arm is 29 in. Three speed changes which are modeled after automobile transmission gears are furnished and any change can be secured by the manipulation of but one lever while the machine is running.

There are twenty-one spindle speeds which range from 27 to 450 r.p.m. The spindle runs in phosphor bronze bearings, has two keyways and a ball bearing is provided to take up the thrust. The spindle rack is cut directly on the sleeve which is of bar steel, an arrangement which it is pointed out insures a wide bearing for the hardened rack pinion and brings the point of pressure close to the center. The spindle can be brought to within 10 in. of the column and it has a vertical travel of 12 in.

The spindle driving gear rests and revolves upon a ball bearing which it is claimed saves more than 15 per cent. of the power by reason of the great friction to which this gear is subjected when the spindle feeds downward. Two driving keys are furnished. The feed is of the all-geared type and there are eight changes ranging from 0.007 to 0.040 in. per revolution of the spindle, which can be varied while drilling by a conveniently located handle on the head. The feed wormwheel runs in an oil bath. A feature of the feed is that time is saved when starting to drill by having the hand feed work ahead of the power one.

The design of the automatic stop and depth gauge is somewhat unusual. In operation a swinging dog attached to an extension of the spindle sleeve is brought into contact with an adjustable dog on the feed bar. A graduated scale by which the predetermined depth of a hole is gauged from zero is fixed to the dog, several of which can be put on the feed bar and the swinging dog successively brought into contact with them for different depths. A safety release for the end of the rack is provided. The quick advance and return has four handles, any one of which engages and disengages the feed instantly, while at the same time the device serves as a pilot wheel for hand operation of the spindle. The tapping, starting and stopping mechanism is of the friction type embodied in the head and is operated by the horizontal lever shown below the arm. The friction bands, which are of large diameter with wide faces, are of the double expanding type



One of the Redesigned High Duty Line of 3 and 3½ Ft. Plain Radial Drilling Machines Built by the Dreses Machine Tool Company, Cincinnati, Ohio

and are made of phosphor bronze to avoid cutting. A material increase in the pulling power is claimed for these frictions and the bevel gears containing them run in an oil bath. The back gear lever enables taps to be backed out at three times their normal speed.

The speed variator has seven changes, and to overcome the shock when passing from one to another the machine is always run at the slowest speed through the action of the builder's self-releasing over-take clutch. There are but nine gears in this speed changing device and they are made of hardened steel forgings with large diameters and wide faces. The gears run in an oil bath and the teeth are of the 20-deg. involute pointed form which insures strength and easy engagement. An annular ball bearing is furnished for the pulley shaft. Special cutters are used for the spur gears and all below 7 in. in diameter and all bevel gears are of forged or bar steel and hardened. Steel castings are used for the larger gears which are subjected to heavy duty. Removable phosphor bronze bushings are provided for all high speed bearings and all the others have interchangeable cast-iron bushings of special metal.

The regular equipment of the machine includes a box table with planed T slots and a working surface of 17 x 22 in., a wooden tool shelf and a countershaft with tight and loose pulleys. If desired a five-step cone driving pulley or a motor drive can be substituted for the single pulley and speed variator. Tilting or universal tables can also be furnished to order.

The International Exposition of Inventions will hold its second exhibition at the Coliseum, St. Louis, November 11 to 17. The first one was held in September, 1911, and proved to be of such interest that at special request F. W. Payne, secretary and manager of the Coliseum, will repeat it. The Exposition of Inventions is said to be a "clearing house of ideas," for through it the man of originality and ideas is brought in personal contact with the man in need of ideas and with the man of money. It affords the inventor an opportunity to display his idea; and the manufacturer who is looking for some sort of device which will lessen the labor and cost of producing his wares, or the capitalist who is searching for some clever device in which he can see the possibility of increasing some of his idle money, can go and see what the man of ideas has to offer.

The report of the building inspector of Louisville, Ky., shows that during the fiscal year 1912, which terminated August 31, 100 boilers with smoke consumers were installed. The inspector states that practically all of the permits issued were for high-pressure boilers suitably equipped with approved smoke consumers.

The Production of Sound Steel Ingots

A New Method of Employing Thermit—Dr. J. E. Stead on the Phenomena of Solidification at the Center of the Ingot

As has already been indicated in these columns, the chief feature of the technical sessions of the Iron and Steel Institute, at Leeds, England, October 1 to 3, were the papers and discussions on methods of producing sound steel ingots. The papers of Sir Robert A. Hadfield, the one on "A Method of Producing Sound Ingots" and the other on "A New Method of Revealing Segregation in Steel Ingots" were given in liberal summary in *The Iron Age* of October 3. In our issue of October 17 appeared the statement of Dr. J. E. Stead, in the discussion on the Hadfield papers, describing the method developed by Benjamin Talbot at Middlesbrough, Eng., for the prevention of piping in steel and guarding against segregation.

The Use of Thermit

Bearing on the same subject was a paper by Dr. Hans Goldschmidt, Essen, Germany, entitled, "Improving the Soundness of Steel Ingots by Thermit." The paper referred to a method formerly in use, which consisted in breaking open the crust which formed at the top of the metal in the mold and plunging a cartridge filled with thermit into the pipe, in order to remelt the surrounding parts; then as soon as this remelting was effected, filling up by pouring in fresh liquid steel from the ladle. An improvement on that method, which it was the object of the paper to describe, consisted in quickly plunging the cartridge to the bottom of the ingot, before solidification begins to set in or before segregation takes place. The author said of the working of his process:

> The reaction immediately causes an energetic ebullition of the liquid contents of the ingot mold, and the gases which have just begun to separate out are violently expelled, or, if the charge has not been siliconized, the bubbling of the metal due to the disengagement of the gas is incidentally checked. But the most noticeable feature is the sinking down of the liquid metal in the mold by more than a hand's-breadth as soon as the reaction is complete, and the density of the material is increased by an amount corresponding to this reduction of volume. Further metal is then poured in from the ladle, until the level of the ingot is restored, and the ingot, if of non-siliconized steel, is then covered with an iron plate in the usual way.

Details were given of some of the results obtained with plates rolled from slabs treated with thermit in the way described. The number of plates rejected owing to faultiness of the ingot amounted only to 0.3 per cent. of the total weight of the ingot. It was stated that greater regularity in working was insured, and it was found possible, keeping the plates the same weight as before, to reduce the weight of all the ingots by 5 per cent. The strength in different parts of the plate was found to be much more uniform. The cost, when only small ingots are cast, does not exceed 1s. 6d. per ton and a net saving computed at 1s. 6d. per ton of plates rolled results. The author says that in the case of large ingots the economy is considerably greater since the cost of the thermit treatment is then reduced to one-half or less. He added that the process is nothing else than a stirring up of the steel, being a purely mechanical and not a thermal one. The weight of the thermit required for a 1-ton ingot is a little over 1 lb., so that the rise in temperature is practically nil. At the bottom of the liquid metal, within a limited region only, an increase in temperature occurs, causing energetic agitation of the highly heated particles. It has been found that workmen are not exposed to any risk in carrying out the process. It has been adopted at a number of works and is being used on a considerable scale.

Top Heat Wanted, Not Bottom Heat

Dr. J. E. Stead, in discussing the papers, said that Sir Robert A. Hadfield and Dr. Goldschmidt based their work on directly opposite principles. One kept the top hot; the other the bottom. He preferred to keep the top hot. He would like to put a refrigerator at the bottom and a blast at the top. The results from the Goldschmidt process were remarkable, but they would be still better if the thermit cylinder was put nearer the top. Dr. Goldschmidt had stated that the steel was non-siliconized, but in introducing thermit into ingots he had done exactly the equivalent of introducing silicon, as thermit gave aluminum in excess. Why not add a much smaller quantity of aluminum direct, as aluminum is commonly used to produce sound ingots? He believed that if some slight modification were made, Dr. Goldschmidt would obtain better results.

Accumulated evidence of the last few years had proved that in ingots of non-gaseous steel, unless poured at a very slow rate, or into molds having their wide ends uppermost, the steel remains fluid for a longer period in the lower central axis than in the corresponding upper parts. This was proved by the fact that in very much piped ingots the lower end of the pipe passes right through the upper central axis into the lower portion. Bearing directly on the nature of the partly solidified central axis referred to in one of Sir Robert's papers, Dr. Stead submitted a photograph of an etched rail section in which the central axis was nearly pure iron. Instead of being segregated with all the impurity of the ingot in the center it had an absolutely pure heart. To explain this he showed a sectional drawing of an ingot, showing the crystallites of pure iron which fall out of solution just at the time when the steel is beginning to freeze.

Pure Iron and Segregates Mixed in the Central Column

What happens when the steel begins to freeze is that pure iron is formed, and if the crystals are forming or falling in a liquid, and they have not anything to stick to, they must fall to the bottom. If the first crust is formed on the outside of the ingot, and the center is kept warm, the crystals fall down to the bottom of the ingot, and therefore there is in that part of the ingot a concentration of the purest part of the steel. It is the natural thing, but it does not account for everything. Normally, if the ingot were left to solidify completely there would be a normal ingot; but evidence he had been seeking for years had at last arrived to prove that there is in the central column a mixture of crystallites of pure iron and what are generally called segregates. The segregate is a normal part of every steel, but the segregate is only that part which was last to freeze, and which for certain reasons accumulates in the center. Segregates are a normal constituent of steel in every part of it. He could see that at this stage, when there is a big pipe at the top of the ingot, and a central column consisting of a sponge of pure iron and impure liquid, if it were passed through a roll there would occur exactly what might be expected. All the iron crystallites would be pressed together, and the liquid would be forced into the upper part of the pipe, producing an actual mechanical segregation, and leaving practically pure iron in the center. It is very important to remember that if we wait until the point when the steel is nearly all completely set in the sectional axis, segregation is created by mechanical means. He might be asked for proof of this. In the last few years he had found finished material from the tops of ingots in which there was absolute evidence that mechanical segregation had actually taken place. He exhibited a piece of segregated steel produced exactly in the way he had described. The center part of it appeared as if it had been dovetailed in, the middle containing nearly 0.7 per cent. carbon, while the outside contained only 0.15 per cent. Not only was this instance evidence, but many other cases had come to his notice.

Quite recently (March 7, 1912) Karl Neu had practically shown that by designedly rolling ingots before the central portions were solid the central axis of the finished blooms contained steel practically free from metalloids.

Neu also found that the ingots expanded in certain parts during the rolling. Had Neu taken longitudinal sections of his billets it was probable he would have found places where the impure liquid had been segregated.

The Hadfield Copper Test

The question then comes up, what would take place in an ingot, with the central axis still liquid, if copper were run into it, according to Sir Robert Hadfield's method. To get the copper inside the cavity the solid crust at the top would have to be broken through. It would alloy with a portion of the iron, making a fusible mixture, but the copper and the alloy, being heavier than the central column of liquid steel, would run down the central axis between the suspended iron crystallites, displacing the impure residual liquid, which would then rise into the cavity. The ingot, when cold, would have the copper in the lower central axis, and according to Sir Robert the presence of copper there would indicate that at that point there would be normally unsoundness, whereas normally it would be the soundest part. Sir Robert's method, therefore, has its limitations, and can be useful only when the steel has completely set and the copper can find its way into the actual unsound places. If added before, it would be impossible to say whether if an ingot were cast under normal conditions the areas corresponding to those where the copper lodged would be porous or not. If copper were poured down the ingots made sound by Sir Robert Hadfield's excellent method, it was more than probable copper would lodge in the central axis and lead to the erroneous conclusion that ingots produced by that process would be unsound.

W. H. Hatfield pointed out a disadvantage in Dr. Goldschmidt's method in that he went back to the ingot. An aluminum content is introduced by the thermit, the pipe is produced, and then Dr. Goldschmidt goes back again and pours more steel into the ingot. That is a tedious process, and very disadvantageous, compared with Sir Robert Hadfield's. Another member emphasized the marked advantage so far as piping is concerned, as pointed out in Sir Robert's paper, of casting ingots with the wide end up. The putting of charcoal on the top of the molten metal, as in Sir Robert's process, has been common practice for years in the manufacture of crucible steel. The insulating effect of the iron slag which the Hadfield process interposed between the charcoal which was under blast and the metal was referred to. Dr. Stead showed photographs to illustrate how necessary it was, as Sir Robert Hadfield had done, to interpose a layer of inert material between the blast at the top and the steel itself. These photographs were of ingots in which the blast was put directly to the top of the steel without any intervening substance. The result was that the oxide formed by the action of the air or blast penetrated right down to the bottom of the ingot and made it very spongy.

Mining Engineers' Cleveland Meeting

The programme of the 103d meeting of the American Institute of Mining Engineers, to be held in Cleveland beginning Monday evening, October 28, includes a list of 18 papers for the iron and steel section, 16 papers on general subjects in which the Institute is interested, and 10 papers which were presented at a joint meeting of the Institute with the Eighth International Congress of Applied Chemistry, held in New York in September.

The professional sessions are scheduled for 10 a. m. and 2 p. m., Tuesday, October 29, at the Hotel Statler; at 10 a. m. Wednesday at the Hotel Statler, and at 10 a. m. Thursday at the Case School of Applied Science. There is to be an informal smoker with popular addresses Tuesday evening; a subscription banquet at 7.30 p. m. Wednesday, and trips are scheduled for Wednesday and Thursday afternoons. Local arrangements for the meeting are in the hands of a committee of which D. T. Croxton is chairman and C. B. Murray is secretary.

The Industrial Works, Bay City, Mich., has issued a beautifully embossed series of views in book form, illustrating the part played by 42 locomotive cranes in the construction of the steel plants of the Illinois Steel Company at Gary and South Chicago. The story is presented graphically in reproductions of unusual excellence.

Lyons-Atlas Company Buys Atlas Engine Works

The Atlas Engine Works, Indianapolis, was sold October 15 to the Lyons-Atlas Company, a new corporation organized by James W. Lyons as president, William P. Lyons, vice-president, and George W. Lyons, secretary-treasurer, with a capital stock of $500,000. The organizers of the new company are better known in connection with the Lyons Boiler Works, with offices in Chicago and plant at DePere, Wis. The Wisconsin plant will be continued without change, as the Atlas Engine Works has not been a factor in the manufacture of boilers for some time, while at Indianapolis the manufacture of the Knight and other types of automobile engines and of the Atlas crude oil engine (Diesel type) will be continued. The new company will also continue to provide repair parts for Atlas steam engines now in service.

In taking over the plant the Lyons-Atlas Company assumes obligations approximating $1,500,000, including interest on the $1,050,000 bonds secured by a mortgage deed of trust to the Indiana Trust Company. Operation under the new regime began on Wednesday, October 16. The force of employees is to be increased as soon as possible and new equipment is to be installed.

Sheet and Tin Plate Conference.—A joint meeting of manufacturers and jobbers of sheets and tin plates was held at Atlantic City, N. J., October 22. It was well attended by jobbers, and a few manufacturers were present. It was, however, a representative gathering covering the country from New England to Texas. The object of the meeting was to devise some plan whereby manufacturers will respect jobbers' wishes to refrain from selling to the latters' customers at jobbers' prices. The manufacturers present at the conference agreed to this if the others would. This meeting was preliminary to the great convention being held at Atlantic City this week by the hardware jobbers and manufacturers.

The 1912 catalogue of the American Iron & Steed Mfg. Company, Lebanon, Pa., is an unusual product of the engraver and printer. There are 158 pages, 6 x 9 in., and attractive illustration is accompanied by pages of data, giving the reader a clear idea of the character of the product in the company's lines of bolts, nuts, washers, forgings, rods, etc. The unique feature of the work is that the illustrations were given the same amount of elaboration by the engraver that would be bestowed on a highly finished piece of machinery.

The Motsinger Rotary Engine Company, Greensburg, Pa., states that, after a thorough investigation of its engine, Joseph H. Rush and his brother, Leo E. Rush, graduates of the Purdue University, Indiana, have taken a large interest in the company and have been given its management. They have not yet decided on a permanent location of the factory in which the engine will be built. N. H. Motsinger is president of the company; F. W. Landman, vice-president; Charles E. Hays, treasurer, and A. N. Miller, secretary.

The Bridgeport Chain Company, manufacturer of weldless steel wire chains, Bridgeport, Conn., announces that, as in many lines—the hardware products especially—one manufacturer after another has found it necessary to get closer to his trade by direct representation, it has joined the movement, and its many years' pleasant association with Wiebusch & Hilger, Ltd., New York City, has been terminated by mutual consent. Beginning November 1, the company will solicit the trade direct from the factory.

At a special meeting of the Colorado Fuel & Iron Company, held at Denver October 19, it was decided to extend the corporate life of the company, and a certificate was filed with the Secretary of State. The capitalization authorized is $46,200,000; outstanding, $36,235,000.

Scully, Jones & Co., Chicago, have been appointed exclusive agents in that city and adjoining territory in Indiana and Illinois, for all the products of the Calumet Foundry & Equipment Company, Harvey, Ill.

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Railroad Buying and Earnings

The inability of the railroads to make needed purchases of equipment unless permitted to advance their rates has been so much dwelt on in all discussion of rate questions for many months, that there has been an unusual effort to suppress the actual facts about railroad buying. While the reported car contracts of this year to September 30 do not exceed 115,000 to 120,000, it would probably be within bounds to add 15,000 or 20,000 to these figures to arrive at the total actually placed. It is a conservative estimate, in other words, that in the first nine months of this year car orders exceeded the total of 133,000 reported for the year 1911. Meanwhile, the season of car shortage has arrived, and railroad statements are making a showing of earnings to which none of the official forecasts for 1912 was able to rise. The summary of the August statements of railroads operating 239,000 miles of line, published in the past week, shows an increase of 10.3 per cent. in gross earnings over August 1911, while net earnings increased by not less than 13.03 per cent. A continuance of such favorable returns through the next few months, which may be looked for unless there is a trade reverse of which no sign now appears, should put many railroads in a better position than in several years. It is significant that these gratifying figures appear at a time when railroad buying is again the leading feature of the market for steel products.

Steel Rail Requirements

In *The Iron Age* of November 26, 1908, an attempt was made to estimate the quantity of steel rails in existence in this country, in order to illustrate the fact that up to that time a relatively small tonnage had worn out. Since then additional information has become available, so that closer approximation can now be made, and at the same time the figures can be brought up to date. It develops from the more accurate data now available that our early estimate was not far from the truth.

A committee of one of the railroad associations recently obtained returns from 213 railroads, operating 216,951 miles of road, with 244,496 miles of main line track, showing the number of miles of main line track laid in each weight of rail. In about 4000 miles reporting the weight of rail was not given. From the data furnished we compute that the average weight of rail on 240,000 miles of main line track in the United States, as of January 1, 1912, was within a pound of 75 pounds per yard. Poor's statistics for the fiscal year 1911 are out and show 239,991 miles of railroad, with 349,870 miles of track, this latter including second track, sidings, etc. We may assume that 240,000 miles of this track averaged rails 75 pounds to the yard, the remaining 109,000 miles presumably averaging somewhat less; and at 65 pounds for this remainder, which seems to be a fair guess, we have a total of 44,400,000 gross tons of rails in the standard steam railroad track of the country. To this may be added about 7,500,000 tons of steel rails in electric roads and about a million tons in employment in various industrial ways, which gives a grand total of about 53,000,000 tons of steel rails in existence in the United States at the beginning of this year.

The supply of steel rails can be computed as follows, to the beginning of this year:

	Gross tons.
Production	65,700,000
Imports	1,600,000
Total	67,300,000
Exports	4,300,000
Total supply	63,000,000

There is left a difference of about 10,000,000 tons, which is, roughly, the tonnage of steel rails that has worn out in service. This means that only about 16 per cent. of the total tonnage of rails laid from the very beginning has thus far worn out, which would leave 86 per cent. of the track in existence in the country which still has its first steel rails. These, of course, would not be the first rails laid, for over 10,000,000 tons of iron rails have been made, and practically all of them have been replaced with steel.

Familiar as we are with the rapid rate at which rails are wearing out in some cases to-day this deduction is somewhat surprising. Two things must be borne in mind: 1. Upon a few thousand miles of track a disproportionately large part of the total railroad traffic of the country flows, and on this mileage the wear is relatively very rapid. 2. As the total traffic has increased rapidly, the wear upon rails is now much greater than it once was. Statistics of train mileage are not a good index, for the reason that trains grow heavier and run faster. Statistics of freight ton-mileage are better, because trains are more heavily loaded now, the average train load having doubled in the past 14 years.

Poor's statistics show a total freight ton-mileage for 1911 of 258,599,943,687. There has been a steady growth in this traffic, with backsets rarely lasting more than a year. To find one-half as much traffic one must go back to 1899, while the traffic was one-fourth as much in 1888. Thus the traffic doubled in 11 years from 1888 to 1899, and doubled again in 12 years from 1899 to 1911. If the traffic doubles every 12 years, then the traffic in a given 12 years is approximately equal to the total traffic in all the years which preceded that period. Since only about one-sixth of all the rails thus far laid have worn out, and the wear is doubling every 12 years, it naturally follows that the average degree to which existing rails are worn out is greater than has been the case at any time in the past. Replacement, then, must become much more rapid in the future. The traffic in the next 12 years promises to be as great as the traffic in all the past, assuming that business continues to grow at the same percentage rate. The quantity of rails to be replaced in the next 12 years will, however, be considerably greater than the 10,000,000 tons which our computation suggested had been replaced in the past. Estimates made in recent years, based on the mileage of new track laid, have indicated that the standard steam roads were using somewhat less than a million tons a year for replacement purposes. For the future we shall probably start by laying somewhat more than a million tons for replacement, and work up to 2,000,000 tons in a few years, probably less than a dozen.

Poor's latest statistics show 3293 miles of new railroad constructed in the United States in 1911, the smallest total for more than a decade. The annual average for the 10 years ending 1911 was 4529 miles. The increase in track in the year, however, was 9160 miles, while the average annual increase in track in the 10 years was 9304 miles. Thus 1911 fell below the average in miles of railroad by 27.5 per cent., but only 1.5 per cent. in miles of track. This is the present trend of railroad development. The trend is toward development of existing roads rather than the building of new line.

If business conditions stay as they have been in the past few years, we may look for the building of 9000 miles or more of track a year by the standard steam roads, which in 85-pound rails would require 1,250,000 tons or more of rails. Replacements are likely to take an increasing tonnage over 1,000,000 tons, and electric and industrial developments are certain to take a considerable tonnage. We are now exporting half a million tons a year. While the maximum production of rails in the past was 4,000,000 tons, in 1906, and while thus far we have not duplicated that tonnage, the prospect is that in the very near future we shall reach 4,000,000 tons as a normal, and if we make 4,000,000 tons in 1913 it may be regarded as an ordinary performance, instead of standing out prominently as did our production of that quantity six years ago.

The Navy Projectile Contracts

The Navy Department has developed an interesting problem for the consideration of American steel manufacturers and workingmen. The Secretary of the Navy has evidently become imbued with the idea that all our steel manufacturers are given to combining and naming unreasonable prices. For the purpose of circumventing these wicked schemes he conceived the idea of asking a British manufacturer to make a bid on a large quantity of projectiles. He received bids on 12-in. and 14-in. projectiles from a number of American manufacturers and from Hadfield's Steel Foundry Company of Sheffield, as recently reported in these columns, and it was found that the Hadfield bid, if the entire contract was given to that company, would enable the Government to save $654,500 on the 12-in. shells and $317,500 on the 14-in., or a total of $972,000. This would appear to be an amount well worth saving.

The Navy Department, however, was not inclined to go to the full limit in awarding the contract for the purpose of saving this large sum of money. It was obliged to keep another object in view. The fact was foreseen that if such work should for a period of years be done abroad the American manufacturers would be wholly inexperienced in the production of armor-piercing projectiles and the United States would then be completely unprepared to supply essential requirements in time of war. Nevertheless, the intimation is given that if the Hadfield projectiles prove to be satisfactory, and the American steel manufacturers do not in the meantime introduce some cheaper method of manufacture by which they can narrow the gap between American and British prices, other awards will be made absolutely on the merits of the work and the price. On this point we are advised that the Hadfield Company expects to domesticate its system of manufacture in this country and thus establish an American source of such projectiles.

The eight-hour law comes in play in the placing of this contract. It is reported from Washington that this law will be observed by both the British and

the American manufacturers. It has not been announced, however, as to where the eight-hour law is to begin in the production of these projectiles; that is, whether it is to go back as far as the operation of the furnaces in which the steel is made, or whether it is simply to begin with the steel in billet or ingot form ready for forging. It seems that the Attorney General of the United States, to whom this matter has been referred, holds that the eight-hour limitation is "to a certain extent negligible in a matter of this kind." It would be a very peculiar thing if this should be the case. The Attorney General would, in making such a decision, set aside a law which has been taken by manufacturers to mean precisely what it says. Workingmen would also undoubtedly have something to say if such a construction should be announced, as the law was not passed for any other purpose than to conciliate organized labor. It would be a very peculiar thing, indeed, if in almost the first Government contract of importance to be placed after the passage of the eight-hour law some of its provisions should be held nugatory.

The Machine Must Do More Work

Though labor-saving machinery has had a large place in the development of American industries, shortage of labor persists. The machinery has been provided for the most part, of course, to perform work otherwise requiring the high-priced skilled workman; but it has also had for an object a high rate of production, particularly where it was designed to replace manual labor of the lower order of skill.

We are now facing a situation of large demand without sufficient operatives to secure the desired large production. Abroad wars and prosperity are working to reduce immigration, which has commonly met the situation, and it is clear that inventive genius will be spurred to make manufacturing processes still more nearly automatic than is now the case. High rates of wages alone do not appear to be an attraction, with what available help there is now in the country; and such is the desire to follow what may be called the clean pursuits that a disproportionate wage for the hand-soiling occupations seems necessary to fill up the ranks of shop toilers. This very differential is the opportunity for the machinery designer and builder. The task is not easy. It is far from clear how well-known processes of manufacture seemingly requiring personal judgment or widely varying conditions taxing human versatility can be controlled by unthinking machinery; but apparently insurmountable obstacles of the same sort have been met successfully in the past.

One movement calculated to dignify labor is now under way. This is seen in the remarkable popularity of agricultural colleges, which must result in arresting the march from farm to city and in increasing the efficiency of soil cultivation. The higher plane to which this movement is lifting agriculture will remove the stigma which the farm hand sometimes feels. The better social position of the farm worker will react to the advantage of other laborers. A second movement is that for the larger introduction of machinery. It will undoubtedly work to curb the autocratic tendencies of labor and at the same time serve the interests of industry. The wide discussion of industrial education and the growth of continuation and other industrial schools will be a strong influence in increasing manual skill, but a larger ultimate result will be in the impetus thus given to the more complete mechanizing of industrial operations.

The British Iron Trade Balance

While the iron and steel exports of the United States are keeping up at a rate beyond 3,000,000 tons a year, those of Great Britain are making a remarkable showing in spite of the coal strike. For the first nine months of the year British shipments to outside markets amounted to 3,632,000 tons, or 250,000 tons more than in the same portion of 1911. The indications are for nearly 5,000,000 tons of exports this year, while the record in the boom year 1907 was 5,166,000 tons. Not for five years has the outlook for the British iron trade been so hopeful. What calls for special note is that in contrast with the great movement of 1907 this year's exports include only moderate shipments of pig iron, showing an expansion in finished products. In the first nine months of the year British exports of pig iron, ferromanganese and spiegeleisen were 972,000 tons; in 1907 up to September 30 they were 1,554,000 tons. At that time Germany and the United States were drawing on British blast furnaces at an unusual rate.

The import side of Great Britain's foreign trade gives much less satisfaction to her steel manufacturers, as is made plain in this comment of the Iron and Coal Trades Review:

> The imports for the nine months ending September reached the record figure of 1,433,000 tons, or at the rate of about 40 per cent. of our exports in the nine months. Nearly 650,000 tons of semi-finished material were landed in this country. The Germans have also succeeded in sending a greatly increased tonnage of joists, castings, forgings, and wire nails. A certain portion of the imports is accounted for by the coal strike, which resulted in orders being placed abroad which otherwise would have remained in this country, but it must be with some alarm that all connected with the trade will view the growing imports of iron and steel, which increase in good years and bad years alike.

There may be debate till doomsday as to the good or bad economics of the German pool system, with maintained prices at home and bonuses to manufacturers on their low priced exports. But in iron and steel it has tended but one way—to steadily increasing shipments into British and other markets, while British steel manufactures are barely able, by the help of booms like the present one, to hold their own in absolute tonnage, and, relatively speaking, are falling behind.

The National Gas Engine Association will hold its annual meeting December 3, 4 and 5, at the Claypool Hotel, Indianapolis, Ind. A preliminary programme has been issued by Albert Stritmatter, secretary, Cincinnati, Ohio, which gives a list of papers to be read at the meeting. Other papers are to be announced later. The customary arrangements will be made for exhibits of accessories, engine parts, etc. Reservations for space should be sent to R. A. Oglesby, Hercules Electric Company, Indianapolis, Ind., or to Secretary Stritmatter, 224 East Seventh avenue, Cincinnati, Ohio.

The Engineers' Society of Western Pennsylvania has made arrangements for an inspection trip by special train to Cleveland, Ohio, on Saturday, November 2. They will inspect the plant of the White Motor Car Company, the ore docks of the Pennsylvania Lines West, the power plant of the Cleveland Electric & Illuminating Company and perhaps some others.

Fuel Oil Users Must Seek Another Fuel

A development of great importance to users of fuel oil has come in the past week in communications sent out by the Standard Oil Company to many of its customers, saying that it would make no contracts after January 1. It is understood also that the company has announced that it has little fuel oil to sell at any price. The communications referred to were received by a number of steel foundries in the Northwest and Middle West and the probability is that a good many plants, including crucible, open-hearth and steel foundries, will have to be equipped in the near future for the use of gas.

The announcement is particularly surprising in view of a generally accepted notion that there would always be a large amount of marketable fuel oil resulting from the big demand for gasoline which constitutes itself perhaps not more than 5 per cent. of the total petroleum produced in the country. It was, in fact, with the idea of utilizing by-products of gasoline recovery that an impetus was expected to the growth of internal combustion engines utilizing a distillate or low grade fuel. It is, of course, recognized that the fuel material comprehended within this scope is not necessarily the fuel marketed as fuel oil, but certainly the alarming intimation of the result of excessive demands for oil products in other forms makes academic the prophecy that before long we would find a commercial product under some acceptable name distributed widely in tin cans for power use by the smallest buyer. There is not much opportunity in the ten weeks remaining for experimenting and known and tried producer gas apparatus will undoubtedly rise to exceptional popularity.

A Verdict for the Pennsylvania Steel Company

In the United States District Court at New York a verdict was given October 18 in favor of the Pennsylvania Steel Company in its suit against the City of New York for final payment on the Queensboro Bridge. The judgment was for $227,893, interest for four years being added to the company's original claim of $183,426. The city put in a counterclaim for $2,000,000, on the ground that it had made large expenditures to strengthen the bridge, but this was dismissed by the court.

Growing originally out of apprehension following the collapse of the Quebec Bridge during its erection, sensational statements found their way into print regarding the integrity of the Queensboro bridge which have latterly been shown to be founded on erroneous assumptions of facts. In the trial just ended it was admitted by the city's experts that the steel work was of faultless quality and the workmanship of a very high order. The question turned on the responsibility for the design, and this was clearly shown to have been prepared and carried out under the direction of the city's engineers. A striking feature of the case was the detailed testimony of Chief Engineer Johnson and Assistant Engineer Bowman of the Department of Bridges as to plans which had been prepared for the full operation of all the facilities of the bridge—a practical and complete refutation of the theoretical conclusions as testified to by the experts of the city.

British Shells for the Navy

Beekman Winthrop, Acting Secretary of the Navy, has settled the controversy over the award of shell contracts for the current year. Announcement was made October 18 that Hadfield's Steel Foundry Company, Ltd., Sheffield, England, gets a contract for 500 12-in. projectiles at its bid of $187 each, deliveries to be made in New York City. The statutory requirements as to observing the eight-hour law were stipulated in the contract. The American awards made were as follows:

Bethlehem Steel Company, 1500 12-in. shells at $279.40, and 500 14-in. at $500 each; Washington Steel & Ordnance Company, 500 12-in. at $277, and 1000 14-in. at $490 each; Crucible Steel Company of America, 1000 12-in. at $274.75, and 500 14-in. at $500 each.

It is asserted that the Navy Department made use of the Hadfield Company's bid to force American steel makers to cut their prices. The award marks a new policy in the purchase of navy projectiles. The American manufacturers are warned that they must either adopt the Hadfield process and furnish shells at a lower price, or must devise a process of their own to cheapen the cost. The Navy Department, despite its new policy, will pay $414,000 more for 5000 armor-piercing shells than it would have paid if the entire contract had been given to the lowest bidder, the Hadfield Company.

The awards for various other projectiles, over which there was no controversy, international or otherwise, were as follows:

Bethlehem Steel Company, 41,000 14-in. target shells at $54; 1000 12-in. at $34; 7500 4-in. common projectiles at $9.75; 2500 6-in. armor-piercing projectiles at $35, and 1000 7-in. at $62 each.

Tredegar Company, Richmond, Va., 1000 12-in. target projectiles at $34.46 each.

American & British Mfg. Company, Bridgeport, Conn., 2500 4-in. common shells at $9.52, and 4000 5-in. at $13.55 each.

E. W. Bliss Company, Brooklyn, N. Y., 2000 5-in. common projectiles at $13.30; 2000 at $13.39, and 2000 at $13.48 each.

Washington Steel & Ordnance Company, Washington, D. C., 2500 6-in. armor-piercing projectiles at $33; 5000 7-in. at $64, and 3000 8-in. at $96 each.

We are enabled to state that the idea of the Hadfield Company in submitting bids, which was done at the invitation of the Navy Department, was to show that its products can be supplied under the Hadfield system at very reasonable rates and that if desired it would domesticate the system in this country. There was no intention to enter permanently as a competitor from the outside.

American Iron and Steel Institute at Pittsburgh

The acceptances of members of the American Iron and Steel Institute indicate an attendance of over 300 at the Pittsburgh meeting on Friday and Saturday, October 25 and 26. The programme for the three sessions of Friday, which will be held at the Hotel Schenley, is as follows:

Forenoon Session.

President's Address, Elbert H. Gary.

"The Buyer from the Manufacturer's Standpoint," by John L. Haines, assistant to the president, Jones & Laughlin Steel Company.

"The Technical Training of Salesmen," by James M. Camp, General Sales Department, Carnegie Steel Company. Discussion led by Eugene P. Thomas, President United States Steel Products Company.

"The Use of Mayari Iron in Foundry Mixtures," by Quincy Bent, assistant to the president, Maryland Steel Company.

"The Manufacture of Ordnance at the Bethlehem Steel Works," by E. G. Grace, vice president and general manager Bethlehem Steel Company.

Buffet Lunch.

Afternoon Session.

"Coal Mine Ventilation in the Connellsville Coke Region," by Austin King, chief mine inspector H. C. Frick Coke Company. Discussion led by Wilson A. Luce, general manager Ellsworth Collieries Company.

"Recent Developments in the Preparation of Iron Ores," by J. W. H. Hamilton, mining engineer.

"Microscopic Analysis of Steel Sheets," by C. Arthur White, American Sheet & Tin Plate Company.

"Electric Power Production and Distribution in Steel Works," by Stewart C. Coey, engineer Youngstown Sheet & Tube Company. Discussion led by B. R. Shover, Brier Hill Steel Company.

Evening Session.

One of the interesting features expected at the banquet at the Hotel Schenley Friday evening is a moving picture exhibition, showing the processes of iron production "From Mine to Molder," recently prepared by Rogers, Brown & Company, at Buffalo.

For Saturday no definite plans have been made for trips of inspection, but members present at the meeting who desire to visit any manufacturing plants in the Pittsburgh district will find complete arrangements made to that end. The Pittsburgh committee consists of Willis L. King, vice-president Jones & Laughlin Steel Company, chairman; W. B. Schiller, president National Tube Company; A. C. Dinkey, president Carnegie Steel Company; Joseph G. Butler, Jr., vice-president Brier Hill Steel Company, and J. A. Campbell, president Youngstown Sheet & Tube Company, Youngstown, Ohio.

Benjamin Talbot, manager of the Cargo Fleet Iron Company, Ltd., Middlesbrough, England, and Heinrich Oeking, managing director of the Oeking Stahlwerk A. G., Duesseldorf, Germany, will be the guests of the Institute at the Pittsburgh meeting.

The Iron and Metal Markets

Railroad Buying the Feature

A Large Total of Rail and Car Orders for October

Steel Ingot Production at the Record Rate of 100,000 Tons a Day—Pig Iron Market Tightening

Railroad buying on a larger scale than at any time this year has been the feature of the finished steel market in the past week. Rail orders just closed amount to more than 200,000 tons, including 100,000 tons for the Southern Pacific and Union Pacific and 49,000 tons for the Illinois Central. The seaboard rail mill has taken 25,000 tons for Southern lines, of which 12,000 tons was for the San Antonio & Aransas Pass. Rail orders already closed for 1913 are estimated at nearly 1,400,000 tons, which is a record tonnage at this date.

Car orders have borne out recent predictions. Those closed this week amount to 13,000, with 14,000 pending in live inquiries, apart from several thousand cars expected from the New York Central. October business thus far is fully 25,000 cars. The steel for these has been a large item for the mills this month, a single car works contract of the past week being for 40,000 tons of plates and shapes.

This activity of the railroads indicates as great anxiety to get in line on the books of the car works as to make sure of rolling space in rail mills. Already the car companies are filled up well into the spring of 1913.

There is a falling off in the new business coming to steel works apart from railroad requirements, since manufacturing consumers of steel products are covered as a rule until April. Steel companies are evidently avoiding business for later deliveries, though some contracts run through the second quarter and into the third. It is being asserted with more vigor that prices are high enough. Yet the opportunists in the trade, particularly plate mills, have been reaping a harvest, and 1.60c. to 1.65c., Pittsburgh, has been the basis on some plate contracts running into next year.

Buyers find that the material available before May or June, 1913, at the quotations made by some of the largest producers, is limited. In one instance a plate contract for several thousand tons was recently placed at 1.40c., Pittsburgh, but the same consumer had to resort to Eastern mills for a like additional tonnage and there the price was 1.60c., Pittsburgh.

The present price of structural steel has raised a question as to the carrying out of some plans for building; but mills are so crowded, particularly in the Middle West and the Chicago district, that such a purely economic consideration is lost in the pell mell of the struggle to roll and deliver.

Our Pittsburgh report notes that two large interests in that district are requiring all new business to be submitted to the home office, as the mills are not catching up on orders but falling farther behind.

October will be the country's record month in steel ingot production. The Steel Corporation's total will probably exceed 1,550,000 tons, or not far short of 60,000 tons per working day, while for all steel plants the rate has been around 100,000 tons a day, or more than 31,000,000 tons a year.

With this remarkable steel production, the price of billets and sheet bars is still rising. A Buffalo steel plant resumes on November 1, and at Sparrows Point the open hearth department, idle for months, is starting up, a round sale of billets having been made. Central Western rolling mills, short of steel, have found $28 at Eastern mill the minimum for open hearth billets, and sales in the East are made at $30 and higher.

Pig iron markets are quieter, but prices are tightening. A good many consumers, unwilling to pay the prices of September, have found the market in October $1 a ton or more beyond the rejected level.

Eastern Pennsylvania has been the center of activity in the past week. One cast iron pipe interest bought 24,000 tons of Virginia and Pennsylvania iron. Producers of foundry iron in eastern Pennsylvania have advanced their prices rapidly.

A 6000-ton sale of basic iron was made at $17.75 delivered in eastern Pennsylvania, and later a 5000-ton sale at $18.15. At Pittsburgh 5000 tons of basic iron for delivery this year was sold at $16.15 at Valley furnace.

In Virginia iron there has been some speculative buying, estimated at 25,000 tons, and prices have been advanced by one interest to a basis of $16 at furnace for No. 2 X for this year and the first quarter of 1913.

Some buyers of Lake Superior iron ore have been feeling the market, but there are no open developments as to prices for next year. That the advance will be as much as 50 cents is conceded, and it may run up to 75 cents.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Oct. 23, 1912.	Oct. 16, 1912.	Sept. 25, 1912.	Oct. 25, 1911.
Pig Iron, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	**$18.00**	$17.75	$16.85	$15.00
Foundry No. 2, Valley furnace	16.25	16.25	15.00	13.25
Foundry No. 2, Southern, Cincinnati	16.75	16.75	16.25	13.25
Foundry No. 2, Birmingham, Ala.	13.50	13.50	13.00	10.00
Foundry No. 2, at furnace, Chicago*	17.00	17.00	16.50	14.35
Basic, delivered, eastern Pa.	**18.15**	17.50	16.00	14.50
Basic, Valley furnace	**16.15**	16.00	14.75	12.50
Bessemer, Pittsburgh	17.90	17.90	15.90	15.40
Malleable Bessemer, Chicago	17.00	17.00	17.00	14.50
Gray forge, Pittsburgh	16.40	16.40	14.90	13.65
Lake Superior charcoal, Chicago	18.75	18.75	17.75	16.50
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh	**27.00**	26.00	24.00	20.00
Open hearth billets, Pittsburgh	**27.50**	26.50	24.50	19.00
Forging billets, Pittsburgh	**34.00**	33.00	32.00	24.00
Open hearth billets, Philadelphia	30.00	30.00	28.00	21.40
Wire rods, Pittsburgh	28.50	28.50	27.00	26.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	**18.00**	17.50	17.00	13.50
Iron rails, Philadelphia	**18.00**	17.50	17.00	16.00
Car wheels, Chicago	**16.50**	16.00	14.75	12.50
Car wheels, Philadelphia	15.00	15.00	14.25	11.75
Heavy steel scrap, Pittsburgh	**16.25**	16.00	14.50	12.00
Heavy steel scrap, Chicago	**14.25**	14.00	13.00	9.50
Heavy steel scrap, Philadelphia	15.50	15.50	14.50	11.75

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Finished Iron and Steel, Per Pound to Largest Buyers:	Oct. 23, 1912. Cents.	Oct. 16, 1912. Cents.	Sept. 25, 1912. Cents.	Oct. 25, 1911. Cents.
Bessemer rails, heavy, at mill..	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	1.60	1.60	1.47½	1.20
Iron bars, Pittsburgh	1.50	1.50	1.45	1.20
Iron bars, Chicago	1.50	1.50	1.45	1.15
Steel bars, Pittsburgh	1.40	1.40	1.35	1.10
Steel bars, tidewater, New York	1.56	1.56	1.51	1.26
Tank plates, Pittsburgh	1.45	1.45	1.40	1.15
Tank plates, tidewater, New York	1.61	1.61	1.56	1.31
Beams, Pittsburgh	1.45	1.45	1.40	1.20
Beams, tidewater, New York...	1.61	1.61	1.56	1.36
Angles, Pittsburgh	1.45	1.45	1.40	1.20
Angles, tidewater, New York....	1.61	1.61	1.56	1.36
Skelp, grooved steel, Pittsburgh	1.40	1.40	1.30	1.15
Skelp, sheared steel, Pittsburgh	1.45	1.45	1.35	1.25
Sheets, Nails and Wire, Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.25	2.25	2.15	1.85
Wire nails, Pittsburgh.....	1.70	1.70	1.70	1.60
Cut nails, Pittsburgh.....	1.65	1.65	1.60	1.50
Cut nails, f.o.b., Eastern mills..	1.70	...	...	...
Fence wire, ann'l'd, 0 to 9, Pgh.	1.50	1.50	1.50	1.40
Barb wire, galv., Pittsburgh....	2.10	2.10	2.00	1.90
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt shipment.	**$3.75**	$3.50	$2.50	$1.50
Furnace coke, future delivery..	**2.75**	2.60	2.50	1.55
Foundry coke, prompt shipment.	**4.00**	3.75	2.75	1.80
Foundry coke, future delivery..	**3.50**	3.00	2.75	2.00
Metals, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	17.75	17.75	17.75	12.62½
Electrolytic copper, New York..	17.62½	17.62½	17.70	12.50
Spelter, St. Louis	7.40	7.40	7.50	6.20
Spelter, New York	7.55	7.55	7.65	6.35
Lead, St. Louis	4.90	4.90	4.95	4.15
Lead, New York	5.05	5.05	5.10	4.25
Tin, New York	**50.40**	49.87½	50.10	42.05
Antimony, Hallett, New York..	**9.75**	9.50	8.87½	7.70
Tin plate, 100 lb. box, Pittsburgh	$3.60	$3.60	$3.60	$3.60

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.45c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft., down to the weight of 3-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.....	.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive fire box steel	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inc.	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inc.	.50
Cutting to lengths or diameters under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, $28.50. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.50; galvanized, $1.90. Galvanized barb wire, to jobbers, $2.10; painted, $1.70. Wire nails to jobbers, $1.70.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.65	$1.70	$1.75	$1.80	$1.90	$2.00	$2.10	$2.20
Galvanized	2.05	2.10	2.15	2.20	2.30	2.40	2.80	2.90

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. and over, and zees, 3 in. and over, 1.45c. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.....	1.50 to 1.55
H-beams over 18 in.....	1.50 to 1.55
Angles over 6 in.....	1.50 to 1.55
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card, Sept. 1, 1909.....	1.50 to 1.55
Tees, 3 in. and up.....	1.50 to 1.55
Angles, channels and tees, under 3 in. plus full extras as per steel bar card Sept. 1, 1909....	1.50 to 1.55
Deck beams and bulb angles	1.75 to 1.80
Hand rail tees	2.20 to 2.30
Checkered, trough and corrugated floor plates...	2.35 to 2.55

Extras for Cutting to Length.

	Cents per lb.
Under 3 ft., to 2 ft. inclusive.....	.25
Under 2 ft., to 1 ft. inclusive.....	.50
Under 1 ft.....	1.55

No charge for cutting to lengths 3 ft. and over.

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8	1.60
Nos. 9 and 10	1.65
Nos. 11 and 12	1.70
Nos. 13 and 14	1.75
Nos. 15 and 16	1.80

Box Annealed Sheets, Cold Rolled.

Nos. 10 and 11	1.90
No. 12	1.90
Nos. 13 and 14	1.95
Nos 15 and 16	2.00
Nos. 17 to 21	2.05
Nos. 22 and 24	2.10
Nos. 25 and 26	2.15
No. 27	2.20
No. 28	2.25
No. 29	2.30
No. 30	2.40

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	2.40
No. 12	2.50
Nos. 13 and 14	2.50
Nos. 15 and 16	2.65
Nos. 17 to 21	2.80
Nos. 22 and 24	2.95
Nos. 25 and 26	3.10
No. 27	3.25
No. 28	3.40
No. 29	3.55
No. 30	3.70

Effective April 18, 1912, the rates for painted and formed roofing sheets, per 100 lb., are based on the following extras for painting and forming over prices for corresponding gauges in black and galvanized sheets:

Corrugated Roofing Sheets by Weight.

	29	25 to 28	19 to 24	12 to 18
Painting.				
Regular or oiling.....	...	0.15	0.10	0.05
Graphite, regular	...	0.25	0.15	0.10
Forming.				
2, 2½, 3 and 5 in. corrugated	0.05	0.05	0.05	0.05
2 V-crimped, without sticks..	0.05	0.05	0.05	...
¼ to 1¼ in. corrugated.....	0.10	0.10	0.10	...
3 V-crimped, without sticks...	0.10	0.10	0.10	...
Pressed standard seam, with cleats	...	0.15	0.15	...
Plain roll roofing, with or without cleats	0.15	0.15	0.15	...
Plain brick siding	...	0.20	...	...
3-15 in. crimped.....	0.20	0.20	0.20	...
Weatherboard siding	...	0.25	0.25	...
Beaded ceiling	...	0.25	0.25	...
Rock face brick and stone siding	...	0.25	0.25	...
Roll and cap roofing, with caps and cleats	0.25	0.25	...	...
Roofing valley, 12 in. and wider	...	0.25	0.25	...
Ridge roll and flashing (plain or corrugated)	...	0.65	0.65	0.65

Boiler Tubes.—Discounts on lap welded steel and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel.		*Standard Charcoal Iron.*	
1¾ to 2¼ in.....	62	1½ in.	46
2½ in.	64½	1¾ to 2¼ in.....	48
2¾ to 3¼ in.....	69½	2½ in.	53
3½ to 4 in.....	72	2¾ to 3¼ in.....	55½
5 and 6 in.....	64½	3½ to 5 in.....	58
7 to 13 in.....	62		

Locomotive and steamship special grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (card weight) in effect from September 10, 1912, one point greater being allowed on merchant weight; iron pipe (full weight), from September 3, 1912:

Butt Weld.

Steel. Inches.	Black.	Galv.	Iron. Inches.	Black.	Galv.
⅛, ¼ and ⅜	72	52	⅛ and ¼	65	48
½	76	66	⅜	67	51
¾ to 3	79	71	½	70	57
			¾ to 1½	73	62
			2 and 2½	74	63

Lap Weld.

2	76	68	1¼	58	48
2½ to 6	78	70	1½	69	59
7 to 12	76	66	2	70	61
13 to 15	53	..	2½ to 4	72	64
			4½ to 6	71	63
			7 to 12	69	56

Plugged and Reamed.

1 to 3, butt	77	69	1 to 1¼, butt	71	60
2, lap	74	66	2, butt	72	61
2½ to 4, lap	76	68	1¼, lap	56	46
			1½, lap	67	57
			2, lap	68	59
			2½ to 4, lap	70	62

Butt Weld, extra strong, plain ends.

⅛, ¼ and ⅜	68	58	⅜	64	53
½	73	67	½	68	61
¾ to 1½	77	71	¾ to 1½	72	63
2 to 3	78	72	2	73	64

Lap Weld, extra strong, plain ends.

2	74	66	1¼	66	60
2½ to 4	76	68	2	67	61
4½ to 6	75	67	2½ to 4	71	64
7 to 8	68	58	4½ to 6	70	63
9 to 12	63	53	7 and 8	64	54
			9 to 12	59	48

Butt Weld, double extra strong, plain ends.

½	63	57	½	58	60
¾ to 1½	66	60	¾ to 1½	61	53
2 to 2½	68	62	2 to 2½	63	55

Butt Weld, double extra strong, plain ends.

2	64	58	2	56	50
2½ to 4	66	60	2½ to 4	61	55
4½ to 6	65	59	4½ to 6	60	54
7 to 8	58	48	7 to 8	53	43

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Pittsburgh

PITTSBURGH, PA., October 23, 1912.

The greatest problem confronting steel manufacturers is to make an equitable distribution of their products in the attempt to satisfy their customers. The leading steel companies say they are not attempting to increase the obligations on their books, believing they have all they can possibly handle for the next four or five months. Two of them have given strict orders to all their sales agents that all important inquiries for material must be submitted to the home offices. Shipments of iron and steel products this month will be the heaviest in any one month this year, but the situation as regards deliveries seems to be getting worse, partly due to the car shortage. The supply of labor is reported slightly better, and it will no doubt still further improve as many men now having outside jobs will soon be hunting inside work.

Pig Iron.—While there has been no notable buying in the past week, there is a fair amount of inquiry. From 35,000 to 40,000 tons of basic iron is under negotiation for delivery this year and in first quarter. While Bessemer iron is held at $17 at Valley furnace, a small lot is occasionally offered by dealers at a shade under. A fair tonnage of foundry iron is moving from furnaces to consumers, who find they have not bought enough and have to come in the market again. We quote standard Bessemer iron at $17 to $17.25 for either this year or first quarter; basic, $16.15 to $16.25 for prompt, $16.25 for first quarter and $16.50 for first half; No. 2 foundry, $16.25 to $16.50; malleable Bessemer, $16 to $16.25, and gray forge $15.50 to $15.60, all at Valley furnace, the freight rate for delivery in the Pittsburgh district being 90c. a ton. A sale is reported of 5000 tons of basic pig iron, for October, November and December delivery at $16.15, Valley furnace.

Billets and Sheet Bars.—A local maker of sheets and tin plate who has been scouring the market for the past week or more trying to find some steel was offered a round tonnage of open hearth billets at $28 at Eastern mill, equal to about $30, Pittsburgh, and a counter offer of a lower figure failed to budge the seller. This will give some idea of how tight the steel market is. Two or three large makers of billets and sheet bars say they would gladly buy outside steel if it could be found and at anything like a reasonable price. It is stated that small lots of Bessemer billets have sold in the past week for reasonably prompt delivery at close to $27 at maker's mill, and $28 has been paid for 400 tons of open hearth slabs. It is not a question of price in steel, but to find a mill that has any to spare.

Ferroalloys.—Dealers state that the price of 80 per cent. ferromanganese for next year is from $62 to $63.50, Baltimore. Consumers are pretty well covered, but several carloads have been sold for spot shipment at about $68 Baltimore, the freight rate to Pittsburgh being $1.95 a ton. The recent advance of $2.50 in 50 per cent. ferrosilicon is being firmly held, and the lower grades are also up from $2 to $3 a ton. We quote 50 per cent. ferrosilicon in lots up to 100 tons at $75; over 100 tons to 600 tons, $74; and over 600 tons, $73, Pittsburgh. The lower grades are firm at $23 for 10 per cent., $24 for 11 per cent., and $25 for 12 per cent., f.o.b. cars at furnace at Jackson, Ohio, or Ashland, Ky. We quote ferrotitanium at 8c. per lb. in carload lots; 10c. in 2000 lb. lots and over, and 12½c. in lots up to 2000 lb.

Steel Rails.—The Carnegie Steel Company is now working out the details on several large contracts for standard sections which it has recently taken and additional contracts are under negotiation. The new demand for light rails continues active, the same company having received new orders and specifications in the past week for close to 4500 tons. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45-lb. sections, 1.25c.; 16 and 20-lb., 1.30c.; 12 and 14-lb., 1.35c., and 8 and 10-lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Wire Rods.—The demand is fairly active, but the supply of rods available for the open market is limited. We quote Bessemer, open hearth and chain rods at $28.50 to $29, Pittsburgh.

Muck Bar.—This material continues very scarce, but the new demand is rather limited. We quote best grades made from all pig iron at $32.50 to $33, Pittsburgh.

Skelp.—The mills being pretty well filled, skelp is scarce, especially grooved and sheared iron. A sale of 2000 tons of wide iron plates for November and December delivery is reported on the basis of about 1.80c., Pittsburgh. We quote grooved steel skelp at 1.40c. to 1.45c.; sheared steel skelp, 1.45c. to 1.50c.; grooved iron skelp, 1.65c. to 1.70c.; and sheared iron skelp, 1.75c. to 1.80c., delivered at buyer's mill in Pittsburgh district.

Structural Material.—The Carnegie Steel Company will furnish the shapes and bars for several large boats being built by the Newport News Shipbuilding & Dry Dock Company, but the plates will be furnished by Eastern mills. No large contracts have been taken by local fabricators in the past week, as they are filled up so far that they are not actively seeking new business. We quote beams and channels up to 15 in. at 1.45c. for delivery at the convenience of the mill, which means the first or second quarter of next year, but premiums of $3 to $5 a ton are being paid for small lots for delivery in three or four weeks. The Carnegie Company will furnish 3750 tons of structural steel for the new municipal viaduct for the city of Cleveland, Ohio, of which about one-third will be nickel steel, the King Bridge Company having the general contract. The McClintic-Marshall Construction Company has taken a contract for 2200 tons of steel for extensions to the open-hearth building of the Republic Iron & Steel Company, Youngstown, Ohio, and has taken a steel building 150 x 280 ft. for the Osgood Bradley Company, Worcester, Mass., about 300 tons.

Plates.—A notable inquiry in the market is from the Mexican Eagle Oil Company for about 20,000 tons of ¼-in. plates to be used for building oil tanks, deliveries running over the next 18 months. The Northern Pacific is in the market for 4500 box cars, the Chicago & Northwestern for 6000, and the Chesapeake & Ohio for 3000 to 4000 heavy coal cars. The Norfolk & Western will build 500 gondolas at its own shops in Norfolk, Va. The Pennsylvania Railroad, which sent out a definite inquiry recently for 5000 cars, is reported to have increased this to 9000 cars. The plate mills are congested with business and two leading makers in this city are not taking orders for delivery before the second quarter. We quote ¼ in. and heavier plates at 1.45c., Pittsburgh, for delivery in first and second quarters, but for shipment within two to three weeks $2 to $3 premium is being paid by consumers if they can get the plates.

Iron and Steel Bars.—There is no let up in the new demand for iron and steel bars, while specifications against contracts continue to pour into the mills at such a rate that makers are getting further behind. Such heavy orders for steel bars have been placed with the mills for delivery in first and second quarters that it is stated that the obligations of two of the leading makers are now such that they have very little of their product to spare for delivery prior to July 1. The steel car companies and the implement makers are prominent among the heavy consumers. We quote steel bars at 1.40c. minimum for deliveries at convenience of the mill, while for reasonably prompt shipment from 1.60c. to 1.70c. has been paid. Iron bars are very firm, and we quote these at 1.50c. to 1.55c. at mill, Pittsburgh. Makers of steel bars continue to quote $1 extra per net ton for twisting bars, ¾ in. and larger, and $2 extra for ½ to ⅝ in.

Sheets.—All the leading mills are now quoting the advanced prices on blue annealed, black and galvanized sheets, and it is said that in a few cases premiums of $2 a ton over these prices have been paid to some makers who agree to deliver within three or four weeks. The demand continues heavy, and the mills are fully as far back in deliveries now as they were several months ago. As a rule the makers are not willing to sell into second quarter at present prices, but some have done so, while a very heavy tonnage has been booked for first quarter. The American Sheet & Tin Plate Company is now operating 11 out of 16 of its hot sheet mills at Gary, Ind., three of the four jobbing mills, and one of the two plate mills. Prices are very firm on the basis of 1.65c. for Nos. 9 and 10 blue annealed sheets; 2.25c. for No. 28 black and 3.40c. for No. 28 galvanized in carload and larger lots, f.o.b. mill, Pittsburgh, jobbers charging the usual advances over these prices for small lots from store.

Tin Plate.—While a heavy tonnage has been closed for delivery in first quarter and first half, a good deal of business is still under negotiation. The mills are not urging early placing, however, believing that they may be able to get a better price later. The demand for prompt shipment is dull, as the season is pretty well over. The market is strong on the basis of $3.60 per base box for 14 x 20 coke plates, for delivery over first quarter and first half of next year.

Hoops and Bands.—New buying is only fair. Prices are firm. We quote steel bands at 1.35c. to 1.40c., with extras as per the steel bar card, and hoops at 1.45c. to 1.50c., Pittsburgh, for delivery through first quarter.

Bolts and Rivets.—The demand for both bolts and rivets continues heavy. We quote button head structure rivets at $2 and cone head boiler rivets at $2.10 per 100 lb., base, in carloads, an advance of 25c. being charged for small lots. For first quarter shipment makers are asking $2.25 for structural rivets and $2.35 for boiler rivets. The new discounts on bolts are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 10% off
Small carriage bolts, cut threads	75 and 7½% off
Small carriage bolts, rolled threads	75, 10 and 2½% off
Large carriage bolts	70 and 5% off
Small machine bolts, rolled threads	75, 10 and 7½% off
Small machine bolts, cut threads	75, 10 and 2½% off
Large machine bolts	70 and 10% off
Machine bolts with C.P.C. and T nuts, small	75 and 7½% off
Machine bolts with C.P.C. and T nuts, large	70 and 2½% off
Square hot pressed nuts, blanked and tapped	$5.80 off list
Hexagon nuts	$6.40 off list

Spelter.—While the new demand continues fairly heavy, prices have further gone off. We quote prime grades of Western at 7.30c., East St. Louis, equal to 7.42½c., Pittsburgh.

Railroad Spikes.—Makers report that specifications against contracts are still coming in freely and are larger than the output, so that they are getting further behind in deliveries. Several leading makers are quoting $1.85 on base sizes and $1.90 on small railroad spikes and have taken orders at these prices. There is a scarcity of small railroad spikes. We quote railroad spikes in base sizes, 5½ x 9/16 in., at $1.80 to $1.85, and small railroad and boat spikes at $1.85 to $1.90 per 100 lb., f.o.b. Pittsburgh, for delivery through first quarter.

Wire Products.—The new demand for wire and wire nails continues fairly heavy. Two of the largest makers of wire products have more tonnage on their books at present than at any other time in their history. All the makers of wire products have adopted the new differential of 40c. between annealed and galvanized wire. We quote wire nails at $1.70 to $1.75 per keg; cut nails, $1.65 to $1.70; galvanized barb wire, $2.10 per 100 lb.; painted, $1 70; annealed fence wire, $1.50, and galvanized fence wire, $1.90, f.o.b. Pittsburgh, usual terms, freight added to point of shipment. Jobbers charge the usual advances for small lots from store.

Merchant Steel.—The new demand is not quite as heavy as it was two or three weeks ago, largely due to the fact that consumers have contracted for their requirements for a considerable time ahead. Prices are very strong and we quote: Iron finished tire, 1½ to ⅜ in. and larger, 1.30c., base; under ⅜ in., 1.40c.; planished tire, 1.50c.; channel tire, ¾, ⅞ and 1 in., 1.80c.; 1⅛ in. and larger, 1.65c.; toe calk, 1.85c., base; flat sleigh shoe, 1.35c.; concave and convex, 1.70c.; cutter shoes, tapered or bent, 2.30c.; spring steel, 1.90c.; machinery steel, smooth finish, 1.70c., all f.o.b. cars, Pittsburgh.

Shafting.—Makers report that the new demand is fairly heavy, but not as urgent as recently. The implement makers are now taking in shafting quite freely, and this is helping the general situation. Prices are firm. We quote cold rolled shafting at 60 per cent. off in carload and larger lots and 55 per cent. in small lots delivered in base territory.

Merchant Pipe.—The inquiry from one of the Standard Oil Company interests in this city for 75 miles of 16-in. steel pipe has not yet been placed, but it is stated that it will be given out soon. There is also an inquiry for about 10 miles of 3 and 4-in. pipe from a local interest. The new demand for both iron and steel pipe continues heavy, mills reporting they are turning down orders every day on which they are unable to make the deliveries wanted by customers. Several of the larger makers also state they are getting further behind in deliveries and have their output of tubular goods pretty well sold up through first quarter. An advance is looked for in galvanized pipe of probably one point or $2 a ton. Discounts on both iron and steel pipe are being very firmly held.

Boiler Tubes.—None of the mills making locomotive and merchant tubes has practically any output to sell for this year, but all of them have a good many orders on their books for delivery in first quarter. The output of seamless tubing this year by the makers in this district will break all records, one concern having sold up to September as much seamless tubing as it sold in all of last year. Owing to the higher prices ruling on iron skelp, an advance in prices of iron tubes is looked for in the near future. Discounts on both locomotive and merchant tubes are very firmly held.

Iron and Steel Scrap.—The local market is very strong. Prices on steel scrap have now reached the point where it is desirable for dealers to make contracts with steel mills, giving them scrap and pig iron in exchange for sheet bars and billets. It is said that 25,000 tons or more of pig iron is involved in one deal of this kind. While the steel mills are making a great deal of scrap, their consumption more than offsets this, and there is a scarcity of heavy steel scrap, borings, turnings and other grades used in the open hearth. Select grades of heavy steel scrap have sold at $16.25, with unconfirmed reports of sales at $16.50. We note sales of 2500 tons of low phosphorus steel scrap for delivery over this year at $18.50 delivered; 1500 tons of heavy steel scrap at $16.25 delivered; 300 tons of No. 1 busheling at $15 and about 250 tons of No. 2 at $10.50. A sale of 500 tons of borings is reported at $10.25 and 1000 tons of turnings at $11.50 delivered. Dealers are now quoting per gross ton as follows:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	$16.25 to $16.50
No. 1 foundry cast	15.00 to 15.25
No. 2 foundry cast	14.00 to 14.25
Bundled sheet scrap, f.o.b. consumers' mills Pittsburgh district	13.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	17.25 to 17.25
No. 1 railroad malleable stock	14.50 to 14.75
Grate bars	11.00 to 11.25
Low phosphorus melting stock	18.50 to 18.75
Iron car axles	25.00 to 26.25
Steel car axles	18.00 to 18.25
Locomotive axles, steel	22.00 to 22.25
Locomotive axles, iron	28.00 to 28.25
No. 1 busheling scrap	15.00 to 15.25
No. 2 busheling scrap	10.25 to 10.50
Old car wheels	16.00 to 16.25
*Cast-iron borings	10.25 to 10.50
*Machine shop turnings	11.50 to 11.75
†Sheet bar crop ends	16.75 to 17.00
Old iron rails	16.50 to 16.75
No. 1 R. R. wrought scrap	15.25 to 15.50
Heavy steel axle turnings	13.00 to 13.25
Stove plate	11.00 to 11.25

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Coke.—A leading furnace operator has contracted for about 8000 tons of standard coke for shipment over the first six months of next year at $2.75 at oven. The

market on spot coke is rather quiet, dealers reporting that some days they will have four or five inquiries and then for three or four days there will be none. Standard makes of furnace coke have sold for prompt shipment at $3.85 at oven. A good deal of furnace coke for first half of next year is under negotiation, but furnaces object seriously to paying $2.75 or higher, and these negotiations are slow in closing. We quote standard makes of furnace coke for prompt shipment at $3.75 to $3.85 and for first half delivery at about $2.75 per net ton at oven. Foundry coke for prompt shipment is held at $3.75 to $4, and for first half of next year at $3 to $3.50 at oven.

Chicago

CHICAGO, ILL., October 22, 1912.

In the first half of October specifications received by one local interest for bars, plates and structural shapes exceeded those of the corresponding period in September by 10,000 tons. Sales and specifications in the past week were likewise considerably in excess of producing capacity. In addition, the railroads have entered upon a period of much heavier car buying than can be measured by the surface indication. A few minor advances in price are noted but a general feeling prevails that current quotations are high enough. This, however, does not apply to prompt shipments; in such cases premiums are asked and willingly paid. Jobbers find their situation somewhat improved as a result of heavy deliveries on old orders, and shipment from store is now being made with greater expedition. The local pig iron market is very firm, with sufficient demand to require of the furnaces daily shipments in excess of their make. Spot iron is especially strong and in some instances slight premiums have been paid. The high price for coke and the expected advance in ore are suggestive of further advances in pig iron. Scrap prices, owing to the liberal offering of material and the high level of scrap as compared with finished materials, failed to show further advances during the past week and in some cases developed slight weakness.

Pig Iron.—Compared with the limited amount available, alike from Northern and Southern furnaces, buying of pig iron in this market is still considerable. In addition to the regular buying in anticipation of requirements, a demand for spot iron is developing, indicating that furnaces are falling behind delivery schedules and that foundries are taking business in excess of their expectations. A number of instances are cited where cars on track were taken as soon as offered, and in one case Southern No. 2 iron was sold at $15.25 Birmingham. An instance is also reported of the purchase of 1000 tons of malleable iron, the entire amount being in addition to the melter's regular purchases and 200 tons being required for immediate shipment. But one local interest is in a position to accept business consistently as it is offered. For local iron the general quotation is $17.50 at the furnace and the major portion of the business done is on that basis. Some instances of lower prices are noted but sales at our minimum quotation are exceptional. Southern iron is firm at $14, Birmingham, and with the exception of one interest, which expects to have two additional blasts in stack this month, the amount available for delivery through the first quarter is limited. The handling of cotton by Southern railroads in the next 60 days will doubtless interfere somewhat with deliveries. Prices for spot coke continue to soar and a sale of ten cars on the basis of $4.50, Connellsville, is reported. Virginia iron for first quarter shipment advanced to the basis of $16 for No. 2 X and a further advance in the price of Ohio silvery iron is expected. We quote local irons, f.o.b. furnace, the average switching charge to Chicago foundries being nearly 50c. per ton. Other quotations are for Chicago delivery. Prices on prompt shipment are as follows:

Lake Superior charcoal	$18.75 to $19.25
Northern coke foundry, No. 1	17.50 to 18.00
Northern coke foundry, No. 2	17.00 to 17.50
Northern coke foundry, No. 3	16.50 to 17.00
Northern Scotch, No. 1	17.50 to 18.00
Southern coke, No. 1 foundry and No. 1 soft	18.85 to 19.35
Southern coke, No. 2 foundry and No. 2 soft	18.35 to 18.85
Southern coke, No. 3	17.85 to 18.35
Southern coke, No. 4	17.35 to 17.85
Southern gray forge	16.85
Southern mottled	16.85
Malleable Bessemer	17.00 to 17.50
Standard Bessemer	18.00 to 19.40
Basic	17.00 to 17.50
Jackson Co. and Kentucky silvery, 6 per cent.	19.40 to 20.40
Jackson Co. and Kentucky silvery, 8 per cent.	20.40 to 21.40
Jackson Co. and Kentucky silvery, 10 per cent.	21.40 to 22.40

Rails and Track Supplies.—Recent orders for rails in this market have been very heavy. The largest buying was by the Harriman lines, including the Southern Pacific, Union Pacific and Illinois Central Railroads, the total aggregating approximately 150,000 tons. The Pere Marquette has placed an order for 15,000 tons and the Chicago, Milwaukee & St. Paul has taken a somewhat smaller tonnage for early delivery. Current sales of track fastenings are in lots of one and two carloads, principally for shipment this year, although the leading interest has nothing to offer for that delivery. For prompt shipment track bolts are bringing 2.30c. while for first quarter delivery, one interest is asking only $2.20. We quote standard railroad spikes at 1.90c. to 2c., base; track bolts with square nuts, 2.20c. to 2.30c., base, all in carload lots, Chicago; tie plates, $30 to $32.50 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Notwithstanding the impossibility of obtaining deliveries in the first half of the year, the railroads are placing orders for large numbers of cars and heavy buying of steel for these is under way. Most of the car buying is conducted very quietly, but among the recent orders are 500 flat cars for the Chicago, Burlington & Quincy to be built by the Haskell & Barker Car Company; 1000 gondolas for the Kansas City Southern, placed with the American Car & Foundry Company; 200 flat cars with the Bettendorf Axle Company, and 100 box cars with the Mount Vernon Car & Mfg. Company. The mills are doing remarkably in shipments, but make little headway against their heavily oversold condition. Contracts for fabricated material placed in the week to represent only a limited tonnage including 305 tons for a power station at Kincaid, Ill., and 188 tons for the International Smelting & Refining Company, both awarded to the American Bridge Company. The Minneapolis Steel & Machinery Company will furnish 800 tons of bridge steel for the Great Northern Railway Company, and the Wisconsin Bridge & Iron Company, 352 tons for the Soo Line. The Wisconsin Hotel, Milwaukee, will require 768 tons, to be furnished by Noelke-Richards. The Union Foundry Company, Chicago, will supply 213 tons for a public park building. We quote for Chicago delivery mill shipment, on plain shapes 1.63c. to 1.83c.

Jobbers are finding their conditions somewhat relieved by the receipt of large shipments of structural material from mill and deliveries from store are correspondingly improved. We quote for structural material out of store, base sizes, 2.05c.

Plates.—Locomotive and car orders are alike heavy and published reports include only a part of the business being placed. The Missouri, Kansas & Texas has ordered 40 locomotives, the Elgin Joliet & Eastern 20, and the Northern Pacific 60, from the American Locomotive Company. There is no improvement in the mill situation as regards deliveries and prompt shipment requirements can be filled only from store. We quote for Chicago delivery, mill shipment, 1.63c. to 1.83c.

Jobbers report that the demand for plates is even heavier than it has been and that stocks are replenished with difficulty as rapidly as they are depleted. We quote for delivery from store, 2.05c. base.

Sheets.—Except for blue annealed sheets, of which fairly prompt delivery can be promised, the local mill is entirely out of the market. The tonnage available from other producers is practically exhausted and most makers are declining to consider inquiries which carry over into the last half of next year. Prices in this market are somewhat higher and the minimum quotations apply on but a small portion of the current sales. We quote for Chicago delivery, in carload lots from mill, as follows: No. 28 black sheets, 2.43c. to 2.53c.; No. 28 galvanized, 3.58c. to 3.68c. and No. 10 blue annealed, 1.88c.

Store trade in sheets during the past week has been very heavy, but prices are unchanged. We quote on sheets from jobbers' stocks as follows: No. 10 blue annealed, 2.15c.; No. 28 black, 2.70c.; No. 28 galvanized, 3.95c.

Cast Iron Pipe.—The season is one of customary dullness and no lettings of importance are pending. Routine orders of miscellaneous character aggregate a considerable tonnage and the market is decidedly firm on the strength of pig iron prices. We quote as follows per net ton, Chicago: Water pipe, 4 in., $30; 6 to 12 in., $28; 16 in. and up, $27, with $1 extra for gas pipe.

Wire Products.—Independent makers of wire nails have advanced their price to the basis of $1.75, Pittsburgh, following heavy sales that have filled order books for a considerable period in the future, but new prices are not yet general. The Southern demand for barb wire and fencing is increasing, although still re-

tarded by late harvesting. The advance of $2 a ton on galvanized wire has become generally effective. We quote plain wire, No. 9 and coarser, base, $1.68; wire nails, $1.88 to $1.93; painted bar wire, $1.88 to $1.93; galvanized, $2.28; polished staples, $1.93; galvanized, $2.28, all Chicago.

Bars.—Orders for steel bars already placed have filled the books of local mills practically full up to July 1, and there is a decided disposition on their part to avoid going beyond this period. For such sales as are made from mill with regular delivery, 1.40c., Pittsburgh, is the prevailing price, although the leading interest is not adhering strictly to this basis. Bar iron sales continue heavy and one order for 2000 tons, shipment to begin December 1, is noted at 1.57½c. Hard steel bar prices are firm and the tonnage limited. We quote for mill shipment as follows: Bar iron, 1.50c.; soft steel bars, 1.58c. to 1.65c.; hard steel bars, 1.40c. to 1.60c.; shafting in carloads, 60 per cent. off; less than carloads, 55 per cent. off.

For delivery from store, we quote soft steel bars, 1.95c.; bar iron, 1.95c.; reinforcing bars, 1.95c. base with 5c. extra for twisting in sizes ¾ in. and over, and 7½c. extra for smaller sizes; shafting 55 per cent. off.

Rivets and Bolts.—Although there has been no noticeable increase in demand for rivets, local minimum prices have been advanced $2 a ton, in keeping with the level of bar prices, and 2.08c. is being quoted for shipment this year with an additional $2 for next year's business. Prices for bolts and nuts have also been advanced and we have revised our quotations. We quote from mill as follows: Carriage bolts up to ⅜ in. x 6 in., rolled thread, 75-10-2½; cut thread, 75-7½; larger sizes, 70-5; machine bolts up to ⅜ in. x 4 in., rolled thread, 75-10-7½; cut thread, 75-10-2½; large sizes, 70-10; coach screws, 80-10; hot pressed nuts, square head, $5.80 off per cwt.; hexagon, $6.40 off per cwt. Structural rivets, ¾ to 1¼ in., 1.98c. to 2.08c.; base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.20c., and for boiler rivets, 2.30c. to 2.50c. Machine bolts up to ⅜ x 4 in., 75-5; larger sizes, 70-5; carriage bolts up to ⅜ x 6 in., 75 off; larger sizes, 70 off.

Old Material.—The high prices prevailing for old material have brought out large quantities of scrap from all directions, although in contrast railroad offerings are slightly less than normal. This large supply of scrap, together with the fact that prices are as high as finished material values warrant, has checked the upward movement and in some instances sales have been made at lower figures than prevailed a week ago. Dealers, however, continue to refuse offers for desirable items and old car wheels in particular are scarcely obtainable at any price. Purchases were made in the past week at prices ranging from $16.50 to $17. Railroad lists pending include 300 tons from the Chicago & Alton, 1000 tons from the Chicago, Milwaukee & St. Paul, 2300 tons from the Burlington, 600 tons from the Big Four, 150 tons from the B. & O. Chicago Terminal, and 100 tons from the Toledo, St. Louis & Western. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.

Old iron rails	$18.00 to $18.50
Old steel rails, rerolling	16.25 to 16.75
Old steel rails, less than 3 ft.	14.50 to 15.00
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	16.50 to 17.00
Heavy melting steel scrap	14.25 to 14.50
Frogs, switches and guards, cut apart	14.25 to 14.50
Shoveling steel	14.00 to 14.25
Steel axle turnings	11.25 to 11.75

Per Net Ton.

Iron angles and splice bars	$16.50 to $17.00
Iron arch bars and transoms	17.75 to 18.25
Steel angle bars	13.00 to 13.50
Iron car axles	22.50 to 23.00
Steel car axles	18.25 to 18.75
No. 1 railroad wrought	14.25 to 14.75
No. 2 railroad wrought	13.25 to 13.75
Cut forge	13.25 to 13.75
Steel knuckles and couplers	12.50 to 13.00
Steel springs	13.25 to 13.75
Locomotive tires, smooth	14.25 to 14.75
Machine shop turnings	9.00 to 9.50
Cast and mixed borings	8.25 to 8.75
No. 1 busheling	12.50 to 13.00
No. 2 busheling	9.50 to 10.00
No. 1 boilers, cut to sheets and rings	10.00 to 10.50
Boiler punchings	12.75 to 13.25
No. 1 cast scrap	14.25 to 14.75
Stove plate and light cast scrap	11.75 to 12.25
Railroad malleable	14.00 to 14.50
Agricultural malleable	12.25 to 12.75
Pipes and flues	11.50 to 12.00

Philadelphia

PHILADELPHIA, PA., October 22, 1912.

Pig iron prices continue to advance. Extensive buying of low grade foundry and steel making grades is noted. Basic for first quarter has been sold at $18.15, delivered. Producers are making every effort to restrict buying as the difficulty of obtaining coke is becoming more acute. Further sales of iron ore for 1913 delivery have been made. In finished materials the market has settled to a more uniform basis, particularly in plates and shapes. Iron bars are scarce and prices are still inclined upward. Premiums of several dollars a ton are being paid for prompt billets. Prompt sheets also command a premium. The old material market is strong, but buying by consumers is less active.

Iron Ore.—Sales aggregating 75,000 tons of Wabana ore, for 1913 delivery, have been made to consumers in this district at 7¼c. per unit, this being the price at which previous heavy sales were made. More offerings of ore for next year's delivery are being made. Daquiri Cuban ore has been advanced from 7¼c. to 7¾c. per unit, Philadelphia, on sales of single cargo lots. Consumers are showing more interest. Importations during the week include 5515 tons from Spain, 7093 tons from Sweden, and 28,160 tons from Cuba.

Pig Iron.—Sharp advances in practically all grades characterize the market. Quotations are subject to immediate acceptance. The most important transaction of the week was in low grade, one Delaware River interest taking 9000 tons of a Virginia brand at $14.50, at furnace, for No. 4, for delivery in the next six months, and 15,000 tons of low grade Northern iron for delivery over the remainder of the year. Northern low grade is now pretty firmly established at $17, delivered at Delaware River points. In the higher grades of foundry iron furnaces are not anxious for business even at high prices, being well sold up for a good part of the first quarter. Sales of moderate quantities have been made at a wide range, $18 to $18.50, delivered, about representing prices received for standard analysis No. 2 X for this year's shipment. In some cases as high as $18.75, delivered, is quoted. One Virginia company, which recently made sales of No. 2 X at $15.25, furnace, has practically withdrawn from the market and as high as $16 has been quoted. The leading Virginia producer, having recently made heavy sales, announces a new basis of quotations, placing No. 2 X at $16; No. 2 plain, $15.75; No. 3, $15.50, and No. 4 and lower grades, $15.25, all f.o.b. furnace, for delivery over the remainder of the year and first quarter. For second quarter these quotations are all scaled down 25c. a ton. The leading producers of rolling mill forge in this district are quoting $17.50, delivered, against recent inquiries, one of 1000 tons now being before the trade. After long negotiations a consumer of basic iron in this district placed a contract for 6000 tons at about $17.75, delivered, for first quarter. This transaction was followed by a sale of 5000 tons to a central Pennsylvania consumer at $18.15, delivered, for shipment in the first four months of next year. Further inquiry for several thousand tons of basic delivery this year is noted. Moderate sales of standard analysis low phosphorus iron have been made at $22.50 to $23, delivered here, but makers have now advanced the quotation to $23.50. The market in all grades is extremely strong, and further advances are expected. Sellers are pronounced in their efforts to keep out of the market, as the coke supply is so uncertain. Its scarcity has much to do with checking the bringing in of additional furnace capacity. Quotations for pig iron are practically subject to change over night, but the following range about represents the present market for deliveries in buyers' yards in this district for the remainder of the year, an advance of 50c. a ton usually being quoted for first quarter delivery:

Eastern Pennsylvania No. 2 X foundry	$18.00 to $18.50
Eastern Pennsylvania No. 2 plain	17.75 to 18.00
Virginia No. 2 X foundry	18.25 to 19.00
Virginia No. 2 plain	18.00 to 18.50
Gray forge	17.00 to 17.50
Basic	18.15
Standard low phosphorus	23.00

Ferroalloys.—Moderate sales of 80 per cent. ferromanganese have been made to consumers in this district at $61, seaboard, for first quarter. Tenders of more business at the price named are still the subject of cable confirmation. Small sales of 50 per cent. ferrosilicon have been made at $75, delivered, and in one instance $74 for a lot of over 100 tons was done.

Furnace ferrosilicon is quoted at $26.30 to $28.30, delivered here, according to grade.

Billets.—The demand continues active both for prompt and forward rolling and forging billets. Eastern mills are well sold up; while able to take care of regular customers' requirements, they are not taking on new business except at stiff premiums. For ordinary delivery over this year and first quarter $30, delivered, is quoted for basic open hearth rolling billets, although $32 to $34 is being done for prompt shipments. Forging billets of ordinary analysis are quoted at $34, Eastern mill, while special grades and prompt deliveries bring as high as $38 to $40. Small lots of foreign billets available for early delivery in this market are now afloat, but the quantity is too small to have any important bearing on the market.

Plates.—Orders and specifications entered by Eastern mills continue to be in excess of the productive rate. More forward business is being booked, usually at 1.75c., delivered, for sheared plates. Several makers are now quoting 1.75c. for sheared and 1.80c. for universal plates for delivery in this district over the remainder of the year, and there appears to be a more general disposition to adhere to this basis for general quotations. Plate makers are figuring on about 1000 tons of plates for three small boats taken by a local shipyard.

Structural Material.—Makers of plain shapes are so well engaged that they are not actively seeking business. Mills are being operated at high tension and little material is available for prompt shipment. Several small bridges are being figured on for both the Pennsylvania and Philadelphia & Reading railroads. For ordinary delivery plain shapes are quoted at 1.65c., delivered here, although for near future, or for extended delivery, 1.75c. more closely represents the market.

Sheets.—The demand continues active. Premiums are freely obtained for prompt deliveries, but few mills are in a position to accept that class of business. Western sheets are higher, 1.80c., delivered here, being quoted for No. 10 blue annealed, and 2.40c. for No. 28 gauge. Eastern mills, making smooth, loose-rolled sheets readily obtain advances of ¼c. to ½c. per lb. over these quotations.

Bars.—The demand for iron bars continues active and most mills are well sold up. Makers' prices in this district have been steadily advancing, the principal producers now quoting 1.60c., delivered, as a minimum for ordinary deliveries, and as high as 1.75c., mill, for prompt. Steel bar mills are well sold ahead, prices are firm and little material is available for early delivery.

Coke.—The market is still unsettled; prices for prompt coke are on a high level and current quotations for contract coke deter buying. As high as $3.75, at oven, has been paid for prompt furnace coke, and $4 is now being freely asked. Prompt foundry coke has been sold in moderate lots at $4, at oven. For contract furnace coke $3 to $3.50 has been quoted, while forward foundry coke ranges from $3.25 to $3.65. For delivery in this district the following range of prices per net ton is named:

Connellsville furnace coke	$5.25 to $5.75
Connellsville foundry coke	5.50 to 6.00
Mountain furnace coke	4.85 to 5.25
Mountain foundry coke	4.85 to 5.50

Old Material.—Buying has been somewhat quieter, particularly in the heavier grades, although the market continues strong and prices are firm. Heavy melting steel is being taken in odd lots up to $15.50, delivered; brokers paying full prices. Specialties have been a shade more active, while rolling mill grades are firm. Borings have been scarce and are bringing higher prices. The following range of prices about represents the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, taking a freight rate ranging from 35c. to $1.35 per gross ton:

No. 1 heavy melting steel scrap and crops	$15.50 to $16.00
Old steel rails, rerolling (nominal)	17.00 to 17.50
Low phosphorus heavy melting steel scrap	18.50 to 19.00
Old steel axles	19.00 to 19.50
Old iron axles	25.00 to 26.00
Old iron rails (nominal)	18.00 to 18.50
Old car wheels	15.00 to 15.50
No. 1 railroad wrought	17.00 to 17.50
Wrought iron pipe	14.00 to 14.50
No. 1 forge fire	13.50 to 14.00
No. 2 light iron (nominal)	8.00 to 8.50
Wrought turnings	11.50 to 12.00
Cast borings	11.00 to 11.50
Machinery cast	14.75 to 15.25
Grate bars, railroad	11.25 to 11.75
Stove plate	11.25 to 11.75
Railroad malleable (nominal)	13.00 to 13.50

Cleveland

CLEVELAND, OHIO, October 22, 1912.

Iron Ore.—That there will be an early buying movement is indicated by the fact that some consumers have been feeling the market regarding ore and the price for next year's delivery. It is the general sentiment among sellers that the advance in prices will be 50c. a ton. Some, however, think that it will be slightly more than that. Mining companies have taken advantage of the generally favorable weather so far this month to crowd shipments and the movement continues heavy. This month will run close to 7,000,000 tons. There is a great deal of ore to be brought down yet, and most of the shippers will be kept very busy as long as the weather permits shipments. We quote prices as follows: Old Range Bessemer, $3.75; Mesaba Bessemer, $3.50; old Range non-Bessemer, $3.05; Mesaba non-Bessemer, $2.85.

Pig Iron.—A moderate volume of business in foundry grades in small lots is being placed for first half delivery. The market is very firm. Local prices have been advanced 25c. a ton, and $16.75 at furnace is now the minimum quotation. One seller is quoting $17 as its minimum price for No. 2 foundry both for local delivery and outside shipment. In the Valley the price is well established at $16.50 and it appears doubtful if any iron can be had at a lower price for very early shipment or for future delivery. In Southern grades Virginia iron is now being offered in this market at $14 at furnace for first half. Alabama iron is quoted at $14, Birmingham, but generally only for delivery through the first quarter. For prompt shipment and for first half we quote, delivered Cleveland, as follows:

Bessemer	$17.90
Basic	$16.90 to 17.15
Northern No. 2 foundry	16.90 to 17.25
Southern No. 2 foundry	17.85 to 18.35
Gray forge	16.40 to 16.75
Jackson County silvery, 8 per cent. silicon	20.05 to 20.55

Coke.—The scarcity continues and sales are being made at higher prices. Small sales of furnace coke are reported at $3.75 to $4.25 at oven for standard Connellsville grades. We note a sale of Virginia foundry coke to a Cleveland consumer at $3.50, at oven, for the first half. Connellsville 72-hr. foundry coke is quoted at $4 to $4.15 per net ton, at oven, for spot shipment and $3.50 to $3.75 for contract. Furnace coke is held at $3.75 to $4 for spot shipment and $2.75 for contract.

Finished Iron and Steel.—The largest tonnage of new business that has come out is for several additional foundations for the Superior avenue bridge, Cleveland, which will require 2500 tons of material, 350 tons of which will be reinforcing bars and the remainder sheet steel piling. Bids for this work will be received by the County Commissioner October 30. Important features of the market are greater scarcity of material for early delivery, for which higher prices are being maintained, and numerous inquiries for first half contracts. Several mill agencies are refusing to take on additional business, having nothing to sell for delivery within the next few months and declining to sell for more extended delivery until they have caught up to some extent on orders. Structural material is exceedingly hard to get and is quoted at 1.55c., Eastern mill, for delivery within 30 to 60 days and 1.75c. for quick shipment. The only new inquiry of any size is for 600 tons for an office building in Canton, Ohio. Quotations on plates have been advanced to 1.60c. for early delivery. The minimum quotation on steel bars is 1.40c., Pittsburgh. Iron bars are firm at 1.55c. to 1.60c., Cleveland. Mill shipments are being delayed by the car shortage. Owing to a scarcity of all kinds of material one Cleveland jobbing concern has practically discontinued taking mill business and is devoting its attention almost wholly to its warehouse business, which is very heavy, and it is unable to make deliveries from stock in less than a week or ten days. The scarcity of forging billets is more acute, a leading Eastern mill which has been supplying this market now being sold up for the remainder of the year. Rivet prices are firm at 2c. for structural and 2.10c. for boiler rivets for this year's delivery. Some contracts are being placed for the first half at $2 per ton advance over these prices. Sheet prices are firm at the new quotations.

Old Material.—The demand for all grades continues quite active. Local mills are not buying heavily but dealers are selling large quantities of scrap for outside shipment, mostly to mills in the Valley and Pittsburgh districts. A fair volume of scrap is coming on the

market and mills are taking all that is being offered. The market is very firm. However, local dealers say they can get better prices for shipment outside of the city than are being offered by Cleveland mills. Quotations on several grades have been advanced from 25c. to 50c. a ton. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton.

Old steel rails, rerolling	$15.00 to $15.50
Old iron rails	17.00 to 17.50
Steel car axles	18.75 to 19.25
Heavy melting steel	14.50 to 15.00
Old car wheels	13.50 to 14.00
Relaying rails, 50 lb. and over	23.00 to 23.50
Agricultural malleable	12.00 to 12.50
Railroad malleable	14.00 to 14.50
Light bundled sheet scrap	12.50 to 13.00

Per Net Ton.

Iron car axles	$20.50 to $21.50
Cast borings	8.50 to 8.75
Iron and steel turnings and drillings	9.00 to 9.25
Steel axle turnings	9.25 to 9.50
No. 1 busheling	12.50 to 13.00
No. 1 railroad wrought	14.00 to 14.50
No. 1 cast	13.00 to 13.50
Stove plate	10.00 to 10.50
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, October 23, 1912.—(*By Telegraph.*)

Pig Iron.—Southern Ohio producers have marked up prices on No. 2 foundry, malleable and basic irons to $16.50, Ironton, for any delivery this year. While a small quantity of resale foundry iron is offered below this figure, it will doubtless be taken before the end of this week. Some quiet buying of Northern foundry has occurred for the second quarter, but the majority of sellers are only willing to insert present market quotations in contracts with old customers who had previously covered for their requirements through the first quarter. Southern iron continues strong. While there has been some demand for Southern basic it is hard to obtain, as furnaces in that section are able to readily dispose of their output of foundry iron and are disinclined to blow in on basic unless a substantial premium should be offered. A sale of 1000 tons of No. 2 foundry to a nearby smelter for this year's shipment, about equally divided between Northern and Southern furnaces, is an indication that not every consumer is covered in this territory, especially when the comparatively large number of small orders booked for delivery before April 1 are considered. Northern malleable is still selling in medium sized tonnages, two Ohio companies contracting for 500 tons each for delivery over the next six months. A Michigan melter also took a like quantity for first half shipment. Southern foundry is strong, but $13.50, Birmingham basis, can still be done for prompt shipment, although outside of the Birmingham district proper. First quarter quotations range from $14 to $14.50 and a few contracts have been made at the last named figure for second quarter. The Ohio silvery irons are stronger, with $19, Ironton, representing the average quotation on 8 per cent., but for this year's shipment this price can be shaded. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	$17.00 to $17.50
Southern coke, No. 2 foundry and 2 soft	16.75 to 17.25
Southern coke, No. 3 foundry	16.50 to 17.00
Southern, No. 4 foundry	16.25 to 16.75
Southern gray forge	16.00 to 16.50
Ohio silvery, 8 per cent. silicon	19.70 to 20.20
Southern Ohio coke, No. 1	17.70 to 18.20
Southern Ohio coke, No. 2	17.20 to 17.70
Southern Ohio coke, No. 3	16.95 to 17.45
Southern Ohio malleable Bessemer	17.20 to 17.70
Basic, Northern	17.70 to 18.20
Lake Superior charcoal	19.25 to 19.75
Standard Southern car wheel	25.75 to 26.25

(By Mail)

Coke.—Connellsville furnace coke for prompt shipment has sold as high as $4 per net ton at oven, and a few small lots of 72-hr. standard brands brought $4.25. Oven operators are slow in making contract quotations for first half shipment. The car and labor shortage is serious, and there seems to be no relief in sight. It is probable that a few brands of Connellsville furnace coke could be contracted for around $3.50 to $3.75 for strictly first half shipment, but in no case would these quotations be obtainable if deliveries were wanted to begin before January 1. For Pocahontas coke future business could be placed about 25c. to 50c. a ton lower, but Wise County producers are holding out for prices now prevailing in the Connellsville district. Foundry coke in all three fields is scarce, and for this year's shipment ranges all the way from $3.75 to $4.50 at oven. Only emergency orders are being placed for either furnace or foundry grades.

Finished Material.—Local warehouse stocks of structural shapes and bars are badly broken, and it is difficult for the mills to supply their best customers to meet immediate needs. The demand has slackened somewhat on a few commodities, but sheets continue to be good sellers, and the principal trouble with the rolling mills just now is an inability to make shipments on time. Specifications on contracts for hoops and bands are coming in at such a rapid rate that mill agencies are at a loss as to how to take care of new business. Warehouse prices on steel bars range from 2.05c. to 2.10c. and on structural shapes from 2.10c. to 2.15c.

Old Material.—There has been another small general advance, including almost every class of scrap. While business is brisk, it is the opinion of leading local dealers that the market has reached the top for the time being. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton.

Bundled sheet scrap	$10.75 to $11.25
Old iron rails	15.00 to 15.50
Relaying rails, 50 lb. and up	21.75 to 22.75
Rerolling steel rails	14.00 to 14.50
Melting steel rails	12.00 to 12.50
Old car wheels	13.50 to 14.00

Per Net Ton.

No. 1 railroad wrought	$12.00 to $12.50
Cast borings	8.00 to 8.50
Steel turnings	8.50 to 9.25
No. 1 cast scrap	11.75 to 12.25
Burnt scrap	8.50 to 9.00
Old iron axles	19.00 to 19.50
Locomotive tires (smooth inside)	12.50 to 13.00
Pipes and flues	8.50 to 9.00
Malleable and steel scrap	10.00 to 10.50
Railroad tank and sheet scrap	7.50 to 8.00

Birmingham

BIRMINGHAM, ALA., October 21, 1912.

Pig Iron.—The market is strong at $14 to $14.50. If any iron is sold under $14 it is difficult to ascertain who sold or bought, there being stout denials of any such business. There is all the more reason to credit what the manufacturers say, because they are open in their declaration that they hope the maximum price has been reached at $14.50 and will rest there. Production will be increased considerably this month, but that will have little effect on account of the large demand and small stocks. The latter now consist of about 85,000 tons, of which 45,000 is free iron on makers' yards; 30,000 is warrant and 10,000 basic. One concern, which advanced to $14.50 ten days ago, still adheres to that price with very little to offer between now and the end of the first quarter of 1913. It has a gap on its order books for delivery over the rest of the year, which will enable it to manufacture some for future delivery. The Sloss-Sheffield Company is scheduled to blow in one of the Sheffield stacks during this week and one at North Birmingham before the end of the month. This will give that company five active furnaces. One concern sold 30,000 tons in the first half of the month against a present monthly production of 24,000 tons. This company's stocks on yards will take care of orders in excess of make for a time, but not long. One maker has sold first quarter iron in small lots at $14.50 and another has sold some at that figure for second quarter. As a rule, however, there is little interest in second quarter business and few sales are being made. Far forward business is in the lap of the future with no disposition to advance prices, but $15 iron for second quarter would not be improbable. The orders for 90,000 tons of rails from the Louisville & Nashville, 19,000 from the Atlantic Coast Line and 31,000 from the Illinois Central received by the Tennessee Company recently, all for 1913 delivery, foreshadow good business for the Ensley plant well into next year and a large home consumption of basic iron. Charcoal iron is selling at $24 to $25, with comparatively little going in the past week. Prices per gross ton, f.o.b. cars at Birmingham continue as follows:

No. 1 foundry and soft	$14.00 to $14.50
No. 2 foundry and soft	14.00
No. 3 foundry	13.25 to 13.50
No. 4 foundry	12.50 to 13.00
Gray forge	12.00 to 12.25
Basic	13.50
Charcoal iron	24.00 to 25.00

Cast Iron Pipe.—Orders, output and prices continue

satisfactory to the pipe makers, with some difficulty as to prompt shipment owing to scarcity of cars, which is beginning to prevail in a number of directions. Recent orders are from cities both for new work and repairs. Prices continue on the level of $25 for 4-in. and $23 for 6-in. and up, with $1 added for gas pipe.

Coal and Coke.—Coke is firm at 25 cts. advance, which puts foundry at $3.50 to $3.75 per net ton at oven and by-product about $1 below that price. Coal is in steady demand, but the movement is hampered by car shortage. Several mines on the Southern Railroad were closed down several days last week on this account.

Old Material.—Old material is enjoying the most brisk demand it has had in months. Steel scrap is especially wanted, Cincinnati and other points in that direction sounding the local market. Dealers are asking and holding quite firmly to the following price schedule f.o.b. cars at yards, per gross ton:

Old iron car axles	$15.50 to $16.00
Old steel axles	14.00 to 14.50
Old iron rails	14.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	10.50 to 11.00
No. 1 country wrought	9.00 to 9.50
No. 2 country wrought	8.50 to 9.00
No. 1 machinery	10.00 to 10.50
No. 1 heavy melting steel	9.50 to 10.00
Tram car wheels	10.00 to 10.50
Light cast and stove plate	8.50 to 9.00
Standard car wheels	11.00 to 12.00

St. Louis

ST. LOUIS, MO., October 21, 1912.

The chief feature of the past week has been the increasing evidence of the consumption of material in excess of expected requirements when contracts were made and the urgency with which shipments are being asked by consumers in all lines.

Pig Iron.—The fact has developed that the job founders generally are not only short of material but have in very many cases used up their supplies for the rest of the year. This has accentuated the demand for small lots, making up in great degree for the temporary disappearance from the market of the very large buyers. Shipments, therefore, are the most important element of the situation in this territory and the car shortage is being felt severely. The larger sales of the week included 3000 tons of malleable to two foundries locally and 600 tons of charcoal iron. The chief inquiry in the market at present is for 15,000 tons of basic, either Northern or Southern being acceptable according to conditions of sale and delivery. Quotations now are $14 for No. 2 Southern pig, Birmingham basis, for prompt shipment, and $15 for first quarter. Ohio iron, No. 2, is $17, Ironton basis, and Chicago No. 2 X, $17.50, at furnace, after January 1, none being obtainable before that date.

Old Material.—There has been a slight softening of the scrap market, but the situation as a whole is regarded as satisfactory by the dealers, who expect a renewal of the demand which has fallen off slightly for the moment. No lists came out during the week from the railroads. The demand is now chiefly from the steel consumers for foundry grades. Relaying rails are in sharp demand, with the dealers' yards practically bare of supplies. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.

Old iron rails	$15.00 to $15.50
Old steel rails, rerolling	14.50 to 15.00
Old steel rails, less than 3 ft.	14.00 to 14.50
Relaying rails, standard section, subject to inspection	23.50 to 24.00
Old car wheels	15.00 to 15.50
Heavy melting steel scrap	14.00 to 14.50
Frogs, switches and guards cut apart	14.00 to 14.50

Per Net Ton.

Iron fish plates	$12.50 to $13.00
Iron car axles	20.50 to 21.00
Steel car axles	17.00 to 17.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	12.00 to 12.50
Railway springs	12.25 to 12.75
Locomotive tires, smooth	13.50 to 14.00
No. 1 dealers' forge	10.00 to 10.50
Mixed borings	8.00 to 8.50
No. 1 busheling	11.00 to 11.50
No. 1 boilers cut to sheets and rings	8.50 to 9.00
No. 1 cast scrap	12.50 to 13.00
Stove plate and light cast scrap	9.50 to 10.00
Railroad malleable	12.00 to 12.50
Agricultural malleable	11.00 to 11.50
Pipes and flues	8.50 to 9.00
Railroad sheet and tank scrap	8.75 to 9.25
Railroad grate bars	10.00 to 10.50
Machine shop turnings	9.00 to 9.50

Coke.—The coke situation shows no easing up. Connellsville best 72-hr. selected foundry coke commands $4 per net ton, at oven. Sales of 48-hr. Virginia coke were made during the week at $3.25. Shipments are the most important feature and ability to deliver is the essential element of orders now. One sale was for 3000 tons of 48-hr. Virginia for delivery at St. Joseph, Mo., October, November and December. By-product coke is in light demand at recent quotations.

Finished Iron and Steel.—Specifications against contracts grow heavier instead of lighter and material is going into consumption very rapidly. Structural contracts show specifications far ahead of anticipated requirements and the same situation is true of bars. Purchases on new contracts are expected to be heavy within the next 30 to 45 days. Light rails are in good request from both the coal and the lumber interests. Track fastenings are in good demand at $1 per ton advance over last week for both spikes and bolts. Material for the wagon trade is in especially strong demand, having been sharply affected by the big crops. Plates remain as hard to get as ever, next spring being the best delivery.

Buffalo

BUFFALO, N. Y., October 22, 1912.

Pig Iron.—The subsidence noted last week appears to have been but temporary and inquiry in considerable volume is again in evidence. As nearly as can be ascertained about 20,000 tons of various grades were placed by steel works, pipe works and a diversity of consuming interests. It is impossible, however, for producers to satisfy fully the demand which continues to come in unchecked by the steady upward movement in price schedules. Furnacemen, knowing that they are sold up pretty close to the limit of production for the first half of next year, are restricting their quotations in a large measure to the taking care of the needs of regular customers. The demand for prompt shipment iron is so urgent that even "off grade" irons are commanding $16.50 per ton at furnace. Foundry coke is very active, with insistent demand for rush shipments at the higher prices which are now being asked. We quote as follows for first half delivery, f.o.b. Buffalo:

No. 1 foundry	$17.25 to $17.75
No. 2 X foundry	17.00 to 17.25
No. 2 plain	17.00
No. 3 foundry	16.75 to 17.00
Gray forge	16.50 to 16.75
Malleable	17.00 to 17.50
Basic	17.50 to 18.00
Charcoal, regular brands and analysis	18.75 to 21.25
Charcoal, special brands and analysis	22.00

Finished Iron and Steel.—The continued pressure from consumers for deliveries on contracts is causing further increase in the congested conditions at the mills and some selling agencies are declining to take on new business in general lines of finished products (bars, plates and structural) until mills have worked out the specification obligations to their regular customers. The leading interest and others are accepting business from regular customers for specification over the first quarter of 1913 for shipment at mills' convenience; mills as a rule are unable to promise delivery under six to eight months. Large orders for plates, reinforcing bars and structural material required for use this year remain unsatisfied. Prices for bars, plates and shapes are unchanged from last week. Warehouse business continues to be tremendous and is rapidly wiping out stocks, two to three weeks now being required to get out material. Many jobbers' stocks are becoming entirely depleted, with no prospect of replenishing for some time to come. Car shortage is beginning to give considerable trouble in getting shipments off promptly from mills. Black and galvanized sheets show very active demand and both are firm at the present market level, which is $2 per ton over last week's quotations. Blue annealed sheets have also gone up $1 per ton, and prices on rivets, bolts and nuts have been advanced a like amount. There has been a further advance of $3 per ton in the price of chain and an advance of $3 per ton on flat cold rolled steel, effective October 21. The New York State Steel Company, which has arranged to start its mill November 1 on billets, slabs and blooms, is now accepting contracts for these semi-finished products. A considerable tonnage of billets was placed with this company last week and negotiations are pending for other large amounts. Present ruling prices on billets are $28.50 to $29 per ton, f.o.b. Buffalo. In structural lines the demand is in excess of the ability of fabricators to supply. Many building projects are held back on this account. Bids were opened in Philadelphia this week for the steel for the new Bell Telephone Exchange building at Erie, Pa., requiring about 250 tons.

The Buffalo Structural Steel Company has received the contract for the steel work for the Cliff Paper Company's new factory building at Niagara Falls, about 100 tons, and for the steel for the new Globe Theatre building, Buffalo, and for additions to the Iroquois Brewery and to the Gerhard Lang Brewery, Buffalo. Bids are also being received this week for an extensive addition to the Pennsylvania General Electric Company's plant at Erie, Pa., requiring about 1500 tons.

Old Material.—There is continued activity in heavy melting steel at a slight advance in price; also a fair demand for old car wheels, with an upward price tendency. The advance in price, however, has checked Canadian buying for this commodity, which has been good for some time. In most other lines transactions have not been so large as for the previous week, either with local or outside users, but prices have been strongly maintained. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$14.75 to $15.25
Low phosphorus steel	17.00 to 17.50
No. 1 railroad wrought	15.75 to 16.25
No. 1 railroad and machinery cast scrap	14.00 to 14.50
Old steel axles	16.00 to 16.75
Old iron axles	23.50 to 24.00
Old car wheels	15.50 to 16.25
Railroad malleable	13.75 to 14.25
Boiler plate sheared	15.00 to 15.50
Locomotive grate bars	11.75 to 12.25
Wrought pipe	10.50 to 11.00
Tank iron	10.75 to 11.25
Wrought iron and soft steel turnings	8.75 to 9.00
Clean cast borings	8.00 to 8.50

Germany and the Balkan War

BERLIN, October 10, 1912.

The question of the hour for the iron industry is, How far will the war in southeastern Europe affect Germany's iron and steel exports? Manufacturers and bankers who have expressed themselves on the question betray no uneasiness at all. Thus Commercial Councillor Peter Kloekner, who is one of the leading men in the western iron trade, said on Saturday at the annual stockholders' meeting of the Hasper Eisen und Stahlwerk, of whose board he is chairman, that Germany's exports of iron and steel to the Balkans are of no great importance, and that if the powers succeed in localizing the war it should not have a greater effect on the German iron trade than the war between Turkey and Italy has had. Any decrease in sales there, he said, would be more than made good by the takings of other countries and by the greatly increased orders expected from Italy upon the termination of its war in Tripoli. One of the principal Berlin banks also discussed this matter in its most recent circular, putting forth the view that the increased buying of munitions of war by the Balkan countries in Germany would fully counterbalance the loss in general trade.

The question whether the situation in the Balkans has already influenced the market is answered variously. Thus a correspondent telegraphing from Dortmund two days ago says that an inquiry among the mills brought out the fact that new orders were not coming in to the extent that had been expected, and that the market had grown more quiet. The cause assigned was the uncertain political situation, besides the fact that both dealers and consumers have already covered their requirements for a considerable period ahead.

Prices Still Advancing

Prices, however, remain firm. On the Düsseldorf Exchange on Friday the following changes were noted: Feldspathic ores, 128 marks for 10-ton carloads, against 122 marks at the last previous quotation; the same ores roasted, 185 marks, against 175 marks; 10 to 12 per cent. spiegeleisen, 81 marks f. o. b. Siegen, against 77 marks; Rhenish-Westphalian puddling iron, 68 marks, against 65 marks; steel-making pig, f. o. b. Siegerland, 71 to 72 marks, against 68 to 69 marks; the same iron f. o. b. Rhenish-Westphalian district, 73 to 74 marks, against 70 to 71 marks; German Bessemer, 80.50 marks, against 77.50 marks; German No. 1 foundry, 76.50 marks, against 73.50 marks; No. 3 foundry, 73.50 marks, against 70 marks; ordinary iron bars, 145 to 148 marks, against 140 to 143 marks. The summary of the market given out at the same time says: "A firm tone prevails in all sections of the iron trade, and the mills are heavily employed."

The situation of the pig-iron trade is amply characterized by the fact that stocks were further reduced in September, despite the fact that the daily rate of production increased. The total make for the month was 1,479,285 metric tons, or only 8160 tons less than for the longer month of August. Production exceeded that for September, 1911, by 229,000 tons. The shipments of the Pig-Iron Syndicate in September exceeded allotments by 3.7 per cent., compared with 1½ per cent. in August. Stocks at the furnaces are understood to amount now to only about one week's consumption.

The Plate Mills Exceptionally Busy

The Kontor controlling ship plates announces that it has orders to the middle of 1913, with full work for all its members. In view of the heavy employment of ocean shipping in all countries, it is expected that the plate mills will be kept busy for a long time to come; some of the shipyards, for example, have orders that will hold them at full work till the end of next year. It is regarded as practically certain that big business will be done by plate mills for several years. Efforts are to be made to renew the heavy plate convention, as well as the Kontor.

The Rod Association has just held a meeting to consider its renewal. The fact is now published that the demands for new allotments reach 900,000 tons, whereas the allotments at present amount to 1,100,000 tons. Of this latter amount 800,000 tons is for the home market and 300,000 tons for export. It is regarded as impossible to find markets for 2,000,000 tons of rods, as exports under the most favorable circumstances can hardly be raised to more than 500,000 tons. A further meeting is to be held in November, and meanwhile the works have bound themselves not to take orders running beyond the middle of 1913. One of the most important mills has demanded, as a condition to its remaining in, that wire and wire nails also be included in the combination—a result which is looked upon as out of reach at this time.

The iron trade is interested just now in a report that the Coal Syndicate is discussing an advance of coal and coke prices an average of one mark a ton. The change would not take effect till next April.

The Hasper Eisen und Stahlwerk will build a fourth blast furnace. It is now building an open-hearth steel plant in connection with a new heavy plate mill which will be put into operation before the middle of next year.

Boston

BOSTON, MASS., October 22, 1912.

Old Material.—The trend of prices is upward, though the volume of current sales is on last week's basis. The market is strong, and the speculative tendency has advanced prices somewhat. The quotations given below are of prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points, taking Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$12.50 to $12.75
Low phosphorus steel	13.50 to 14.00
Old steel axles	14.50 to 15.00
Old iron axles	22.00 to 22.50
Mixed shafting	14.00 to 14.50
No. 1 wrought and soft steel	11.50 to 11.75
Skeleton (bundled)	10.50 to 11.00
Wrought iron pipe	10.25 to 10.75
Cotton ties (bundled)	10.75 to 11.00
No. 2 light	4.50 to 5.00
Wrought turnings	8.00 to 8.50
Cast borings	8.00 to 8.50
Machinery, cast	13.00 to 13.50
Malleable	10.50 to 11.00
Stove plate	9.00 to 9.50
Grate bars	7.75 to 8.00
Cast-iron car wheels	13.50 to 14.00

Balkan War Overshadows British Market

Americans Not Sellers—Germany Behind in Orders—Rails to Australia

(By Cable)

MIDDLESBROUGH, ENGLAND, October 23, 1912.

The markets are still overshadowed by the Balkan war and new buying continues slack. Not much is doing in pig iron. Stocks of pig iron in store amount to 262,520 tons. Forge iron is getting very scarce. Semi-finished steel is firm. The German Steel Works Union is getting behind with deliveries and Americans are not sellers, so that there is the possibility of an acute situation later. An

order for 5000 tons of rails for South Australia has been booked by Bolckow, Vaughan & Co., Middlesbrough, at £6 12s. 6d. Ferromanganese has sold at £11 12s. 3d. f. o. b. Liverpool, a figure quoted two weeks ago. We quote as follows:

Cleveland pig iron warrants (closing Tuesday), 66s. 1½d., against 65s. 8½d. one week ago and 66s. 8d. two weeks ago.

No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 66s. 9d, an advance of 6d from last week, which was 1s. 3d. down from the previous week.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £5 17s. 6d. for January-March delivery.

German sheet bars, f.o.b. Antwerp, 110s.

German 2-in. billets, f.o.b. Antwerp, 105s.

German basic steel bars, f.o.b. Antwerp, £6 5s., an advance of 1s. from last week.

Steel bars, export, f.o.b. Clyde, £7 15s. to £7 17s. 6d.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £7 5s. nominal.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel ship plates, Scotch, delivered local yard, £8 2s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 15s.

Steel rails, export, f.o.b. works port, £6 15s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 15s. 6d.

American Companies Quote High Prices on Steel and Germany Gets the Business

MIDDLESBROUGH, October 10, 1912.

The Balkan crisis, with its depressing effect on the pig iron market, it is now believed is merely an episode and powerless to check or divert the full stream of European industrial activity. The autumn months, here at all events, are usually marked by exceptional briskness, and while it does not do to be too much governed by precedent, there is no reason to expect any reversal of common procedure this year. No doubt some of the longer headed consumers have bought farther ahead than they usually do, but there is no question that the rank and file have a lot of covering to look after before they can rest comfortably.

A good deal of business has been done in ferromanganese, and just at present it is not easy to find out exactly what the position is, for some makers, instead of naming c.i.f. ex-ship terms for America, will only quote f.o.b. Liverpool, while others will not quote at all. Were it not that trade is so excellent one would be led to infer that the agreement between producers had come to an end. Nothing of this sort, however, is likely on a strong market. At the time of writing £11 5s., say $56, is asked, f.o.b. Liverpool, which brings the c.i.f. price, duty paid, to about $60.50 for 1913 delivery.

The Steel Corporation is not a ready seller of half-finished products. Within the last two days or so it asked £6 c.i.f. from a Welsh tin plate works for January-June, a price considerably above that at which German steel is to be had, while independent United States sellers ask as much as £6 10s. Such prices simply show that those quoting them do not wish to sell, hence the Verband is deluged with inquiries and has sold heavily at 110s., free on board Antwerp, for sheet bars, which is equal to about 115s. or 116s. c.i.f. Bristol Channel ports. An unusual feature is that Austrian consumers, unable to obtain supplies locally, have actually been approaching Welsh steel works for quantities, but the quotations received, running from £5 17s. 6d. to £6 2s. 6d., were not acceptable. The brilliance of the general outlook is untarnished at present.

New York

NEW YORK, October 23, 1912.

Pig Iron.—Advances in prices are more of a market feature than sales, and the inactivity noted in the past two weeks continues. It is evident that producing capacity cannot be much increased in view of the coke situation and furnace companies are not trying to make sales at prices recently prevailing. In the Metropolitan district no large new business has come up, though a soil pipe interest is inquiring for 2500 tons of No. 2 X and No. 2 plain. One New England inquiry is for 1000 tons of low silicon iron. In New Jersey a 500-ton sale of basic iron is reported. Round sales of basic iron were made in eastern Pennsylvania at $17.75 delivered. Makers are now asking $18 to $18.25 delivered. One eastern Pennsylvania company which has been quoting $17 at furnace for No. 2 X foundry for this year and $17.50 for delivery in 1913, is now asking $17.50 for this year and $17.75 for the first quarter of next year. The leading Virginia interest has advanced its price to $16 at furnace for No. 2 X for any delivery up to April 1. For the second quarter of 1913 its quotation is $15.50 for No. 2 X and $15.25 for No. 2 plain. Buffalo furnaces are asking slightly higher prices and sales in that district have been made as high as $17.50 for No. 2 X for this year. Three Susquehanna furnaces are now in blast at Buffalo and one Niagara furnace at Tonawanda. The New York State Steel Company's furnace at Buffalo has gone on to basic iron. We quote as follows for Northern iron at tidewater: No. 1 foundry, $18 to $18.75; No. 2 X, $17.75 to $18; No. 2 plain, $17.25 to $17.50. Southern iron is quoted at $18.25 to $18.50 for No. 1 foundry and $17.75 to $18.25 for No. 2.

Structural Material.—Local fabricators are inclined to hold that the volume of business now under consideration is rather less than for the same period last year. There is considerable of promise, however, as the subjoined list of structures not heretofore noted will show, and many fabricators are booked for practically three months' work, or through January. Much of the new business, particularly of the little sort, is for early consumption, and the 1.50c., Pittsburgh, is easily minimum, with eight to ten weeks for delivery. The effect of the rise in prices has made itself shown, it is admitted, in a postponement or abandonment of some building work. Of projects recently contracted for may be mentioned the following: Paterno apartment, 10 stories, Seventh avenue and Fifty-eighth street, 600 tons, to Milliken Brothers; New York Central, including 300 tons terminal area work, about 360 tons all told, to Lewis F. Shoemaker & Co.; library, 160th street and St. Nicholas avenue, 100 tons, to Alfred E. Norton Company; 20-story building, Forty-first street east of Fifth avenue, 1500 tons, to Milliken Brothers; Raritan River bridge, Central of New Jersey Railroad, 600 tons, to Pennsylvania Steel Company, and float bridge for the Erie, Jersey City, 100 tons, to American Bridge Company. Pending projects include the following: Twelve-story loft, 133 West Twenty-fifth street; nine-story apartment, 143 East Thirty-ninth street; 12-story apartment, 105 West Seventy-second street; 12-story apartment, Riverside Drive and 119th street; eight-story loft, 377 Fourth street; 12-story loft, 424 West Thirty-third street; nine-story apartment, 102 West Sixty-ninth street; nine-story apartment, 41 West Eighty-third street; 12-story apartment, Fifty-fourth street and Seventh avenue; 12-story loft, 11 West Twenty-fifth street; Cruikshank building, Fourth and Gansevoort streets, 1700 tons; Paterno apartment, 12 stories, 104th street and West End avenue, 700 tons; Robertson apartment, 179th street and Broadway, 700 tons to 1000 tons; building for American Locomotive Company in Long Island City; high school, Lawrence, L. I.; Eye Hospital, Fifth-seventh street and Tenth avenue, 225 tons; theatre and office building, Montclair, N. J.; Nurses' Home, Women's Hospital, West 110th street. We quote plain material at 1.66c. to 1.71c., New York, mill shipments, and 2.15c. from store.

Steel Plates.—One large user of plates has closed on one lot of 2000 tons and probably on another of 1500 tons at 1.60c., Pittsburgh, for the first half, in addition to some 3500 tons referred to last week and closed at 1.40c., Pittsburgh. Some 1500 tons for first quarter are under negotiation at 1.65c., Pittsburgh. Generally speaking mills not already booked far into the first quarter are loath to consider 1913 business. It is believed that 1.45c., Pittsburgh, is absolute minimum, but that for material required within three months 1.60c., Pittsburgh, and better is done. One company is putting a clause into its contracts providing for a cancellation of material not specified each month. Some 12,500 car orders have been placed since last week's report. New live inquiries have come into the market in sufficient volume to bring the total business pending to 13,500 cars, with 7000 to 8000 likely to come out any day from one of the large railroad systems. Among the car orders awarded may be mentioned the following: 500 general service and 200 ore cars for the Northern Pacific; about 6000 cars for the Chicago & Northwestern to the American Car & Foundry Company, the Pullman Company, the Haskell & Barker Car Company and the Barney & Smith Car Company; 15 baggage cars for the Long Island to the American Car & Foundry Company; 25 baggage cars for the New York Central to the Pressed Steel Car Company; 1000 gondolas, 200 flat and 100 automobile for the Kansas City Southern to the American Car & Foundry Company, the Bettendorf Axle Company and the Mount Vernon Car Mfg. Company, respectively; 50 cars for the Philadelphia Rapid Transit to the J. G. Brill Company, and 100 coal cars for the Lehigh &

New England to the Cambria Steel Company. The Norfolk & Western is to build 500 gondolas in its own shops. Among the new inquiries are 500 cars for the San Antonio & Aransas Pass and 2000 for the Detroit, Toledo & Ironton. For the rest of the year we quote sheared plates at 1.76c., New York, and universal plates, 1.81c., New York.

Iron and Steel Bars.—Another advance has been made in bar iron by a leading producer, and with steel bars sold up for a long time ahead and the price "anything you can get" the market is very strong. None of the advances in bar iron has checked the volume of orders and the business still continues to come in large volumes. At least one maker of bar iron and bar iron products is out of the market. Steel bars are nominally at 1.40c., Pittsburgh, or 1.56c. minimum, New York, mill shipments, and from store, 2c.; refined iron bars are now 1.60c., New York, and from store, 2c.

Ferroalloys.—The wide range in quotations for 80 per cent. ferromanganese continues and the situation is unchanged also with regard to the shortage of supplies in some quarters. Representatives of some manufacturers have a limited quantity for prompt delivery and offerings run from $70 to $75, Baltimore, according to seller, quantity and nearness of delivery. For delivery next year the range is from $61 to $63.50, Baltimore, and here again some agents cannot quote. A member of an American house now in England reports that the demand on the other side keeps heavy despite some worriment over the Balkan trouble and fear that the ore supply will be interfered with. There have been no changes in 50 per cent. ferrosilicon. A few inquiries are out calling for carloads of 100-ton lots. Quotations are $75, Pittsburgh, for carloads, $74 for 100 tons and $73 for 600 tons or over.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Company will furnish the 4000 tons of water pipe on which bids were opened by Newark, N. J., October 17. The prices which this company named were $22.90 on the sizes running from 16 to 24 in.; $23.25 on the sizes running from 6 to 12 in., and $22.40 on the high pressure pipe, running up to 20 in. Quite a number of large private buyers have made up their lists of requirements for early spring shipment on which they are now securing prices. These lists are largely for gas pipe. In the past week prices were asked on upward of 6000 tons in this vicinity and New England. Carload lots of 6 in. are quoted at $24.50 to $25 per net ton, tidewater.

Old Material.—The market is fairly active. At the prevailing quotations dealers find that little trouble is experienced in disposing of their stock. It appears to be difficult, however, to secure advances. Steel scrap is moving in good volume, rolling mill stock is in somewhat better demand and cast scrap appears to have completely recovered from its long condition of stagnation, being now in good request. Dealers' quotations, per gross ton, New York and vicinity, are as follows:

Old girder and T rails for melting	$13.00 to $13.50
Heavy melting steel scrap	13.00 to 13.50
Relaying rails	22.50 to 23.00
Rerolling rails	15.00 to 15.50
Iron car axles	23.00 to 24.00
Old steel car axles	17.00 to 17.50
No. 1 railroad wrought	15.00 to 15.50
Wrought iron track scrap	13.50 to 14.00
No. 1 yard wrought, long	13.00 to 13.50
No. 1 yard wrought, short	12.50 to 13.00
Light iron	5.50 to 6.00
Cast borings	9.00 to 9.50
Wrought turnings	9.50 to 10.00
Wrought pipe	12.00 to 12.50
Old car wheels	14.00 to 14.50
No. 1 heavy cast, broken up	13.00 to 13.50
Stove plate	10.25 to 10.75
Locomotive grate bars	10.00 to 10.50
Malleable cast	10.75 to 11.25

Metal Market

NEW YORK, October 23, 1912.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
Oct.	Lake.	Electrolytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
17	17.75	17.62½	49.70	5.05	4.90	7.55	7.40
18	17.75	17.62½	50.00	5.05	4.90	7.55	7.40
19	17.75	17.62½	.....	5.05	4.90	7.55	7.40
21	17.75	17.62½	50.40	5.05	4.90	7.55	7.40
22	17.75	17.62½	50.15	5.05	4.90	7.55	7.40
23	17.75	17.62½	50.40	5.05	4.90	7.55	7.40

Copper is dull and easy. Tin is a fraction higher and quiet. Lead is quiet. Spelter is unchanged. All grades of antimony have advanced.

New York

Copper.—There has been no buying of importance; in fact, little of any kind since the last report. The situation is somewhat difficult to gauge. While electrolytic is still quoted at 17.62½c. and Lake at 17.75c., these prices are nominal, and had there been any real test of the market in the last seven days it is extremely probable that the metal would have sold at lower prices. On Monday the London market dropped £1 5s. because of Balkan war influences and there was a repetition of what occurred the week previous with practically the same results or rather lack of results. No one seemed to want to buy and there followed recoveries in foreign prices both yesterday and to-day. The large interests continue to hold to 17.75c., 30 days' delivery. The explanation of the situation, in view of the excellent consumption, is that consumers covered their needs for some time in the large buying movement of a few months ago. It is not expected in copper circles that there will be another active buying movement until after the publication of the Copper Producers' statement for October. London quoted spot this morning at £76 7s. 6d. and futures at £77 5d. The exports this month have been small, totaling but 14,661 tons.

Pig Tin.—There has been in the past week a little buying of tin, but on the whole not much improvement in activity. Despite the prevailing quietness the market has held up well as regards price, which is slightly higher than it was a week ago. Aside from a little increased buying of spot there were some inquiries for futures, but generally agreement could not be reached as to price and in many instances no sales resulted. The tin market was not affected on Monday as was copper, but on the contrary advanced £2 in London. It lost £1 yesterday which it regained to-day. An interesting phase of the situation is that the supply of tin is not only ample but may be termed generous. The arrivals this month have been 3953 tons and there is afloat 2442 tons. Up to date consumption has continued heavy. London quoted spot this morning at £230 10s. and futures at £229 10s. The price in New York to-day is 50.40c.

Tin Plates.—The market is dull but firm at unchanged prices. The canning season is about over and the heavy demand shows signs of tapering off a bit, and it is not now thought probable that the advance in price, which was believed almost a surety a few weeks ago, will come until there is a further renewal of activity.

Lead.—There is no change in the lead situation which is easy and so dull that business is being sought by those who have the metal to sell. An interesting side light on the situation is the decline in prices in London, where on Monday lead was quoted at £20 17s. 6d. Yesterday the foreign price was £20 10s. and to-day it is down to £19 15s. In considering the possible effect of this decline on the American market, it is to be noted that this side followed Europe upward. A new influence in the lead field, but one which has not made itself felt in prices as yet, is the marketing by the United Metals Selling Company of the metal produced by the International Smelting & Refining Company. While the large interests are adhering to 5.10c., New York, independents are quoting 4.90c., St. Louis, and 5.05c., New York.

Spelter.—Consumption by galvanizers and brass mills continues heavy, but new buying is not marked. It is not believed that prices will touch any lower level for the present. Quotations are 7.55c., New York, 7.40c., St. Louis.

Antimony.—The advancing movement which has prevailed for the last two or three weeks in antimony continues and all grades were again advanced on Monday. The upward movement has been led by Cookson's. The only reason mentioned for the advance is a scarcity of ore, there being an intimation that an effort is being made to corner the raw material. The best buying has been in futures. Cookson's is quoted at 10.50c., Hallett's at 9.75c. and Chinese and Hungarian grades at 9.37½c. to 9.50c.

Old Metals.—The market is not so strong as it has been. Dealers' selling prices are nominally unchanged, as follows:

	Cents per lb.
Copper, heavy and crucible	16.75 to 17.00
Copper, heavy and wire	16.50 to 16.75
Copper, light and bottoms	14.75 to 15.00
Brass, heavy	10.50 to 10.75
Brass, light	8.50 to 8.75
Heavy machine composition	14.25 to 14.50
Clean brass turnings	9.75 to 10.00
Composition turnings	12.00 to 12.50
Lead, heavy	4.75
Lead, tea	4.50
Zinc, scrap	5.75

Chicago

OCTOBER 22.—Copper is unchanged. Tin prices show a sharp advance. Spelter has been easier. In old metals, no material changes are noted. We quote as follows: Casting copper, 17.75c.; Lake, 17.87½c. to 18c.,

in carloads for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 51.50c.; small lots, 53.50c.; lead, desilverized, 5c. to 5.10c. for 50-ton lots; corroding, 5.25c. to 5.35c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 7.62½c.; Cookson's antimony, 11c., and other grades, 10c. in small lots; sheet zinc is $9.10, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 15.50c.; copper bottoms, 14c.; copper clips, 15c.; red brass, 12.75c.; yellow brass, 10c.; lead pipe, 4.25c.; zinc, 5.50c.; pewter, No. 1, 33c.; tinfoil, 39c.; block tin pipe, 45c.

St. Louis

OCTOBER 21.—The metal market has been rather easier the past week, though the demand remains very good. Lead is quotable at 4.90c.; spelter, 7.40c.; Lake copper, 18c. to 18¼c.; electrolytic copper, 17⅞c. to 18.15c.; tin, 50½c. to 50⅞c.; antimony, Cookson's, 10⅜c. to 10½c. In the Joplin ore market there was an easier tendency for both zinc blende and lead ore. In zinc blende the top price was $61 per ton, which was a drop of $2 from last week. The basis range for 60 per cent. was from $54 to $58. Calamine continued in good demand with the range from $31 to $34 for 40 per cent., with the choicest lots bringing as high as $40. Lead ore brought only $65, $2 less than the preceding week. Miscellaneous scrap metals we quote as follows: Light brass, 6.50c.; heavy brass and light copper, 10.50c.; heavy copper and copper wire, 13c.; pewter, 25c.; tinfoil, 32c.; zinc, 4.50c.; lead, 4c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, October 23, 1912.

Although developments in the past week have been of a highly favorable character, such as increased railroad earnings, excellent reports of business from all sections of the country and continued activity in the iron and steel trades, prices of securities have gone off to some extent. The range of prices on active iron and industrial stocks, from Wednesday of last week to Tuesday of this week, has been as follows:

Bald. Loco., com....	58 - 59⅝	Pressed Steel, com..	38 - 40½
Bald. Loco., pref....	106½-107	Pressed Steel, pref.....	102¼
Beth. Steel, com....	46⅝- 51⅛	Railway Spg., com..	37⅜- 38⅛
Beth. Steel, pref...	76 - 78	Railway Spg., pref.....	102
Can, com.....	43¼- 46¼	Republic, com.....	32⅞- 34½
Can, pref.....	122½-124⅜	Republic, pref.....	91 - 92¾
Car & Fdry., com...	60½- 62¾	Sloss, com.....	55¾- 58
Car & Fdry., pref.....	119⅛	Pipe, com.....	19 - 21⅜
Steel Foundries.....	42⅛- 43½	Pipe, pref.....	63 - 64⅜
Colorado Fuel.....	39½- 42⅝	U. S. Steel, com....	77 - 79⅞
General Electric....	181½-182¾	U. S. Steel, pref...	114½-115¼
Gr. N. Ore. Certs...	47¼- 49¼	Westinghouse Elec..	83½- 85
Int. Harv., com....	121½-123	Va. I. C. & Coke...	66 - 67
Int. Harv., pref.....	119¾	Am. Ship, com.....	59¼- 60
Int. Pump, com....	28 - 29⅛	Chic. Pneu. Tool...	54½- 55
Int. Pump, pref....	81 - 81⅛	Cambria Steel	52½- 54⅝
Lackawanna Steel...	51¼- 53	Lake Sup. Corp....	31 - 32
Locomotive, com....	43 - 45½	Pa. Steel, pref.....	99½- 99½
Locomotive, pref....	106¾-107⅞	Warwick	10¾
Nat. En. & St., com.	20⅝- 25⅞	Crucible Steel, com.	17¾- 18½
Nat. En. & St., pref.	93 - 93½	Crucible Steel, pref.	96½- 97
Pittsburgh St., pref.....	103½	Harb. Wk. Ref., pref.....	102

The Griffin Wheel Company, Chicago, is to be reorganized under Massachusetts laws. The present Illinois corporation has $8,000,000 capital stock issued, part common and part 6 per cent. cumulative preferred. The new company will have an authorized issue of $12,000,000 common stock, of which $9,500,000 will be issued, and $8,000,000 preferred stock, $6,000,000 to be issued. The preferred stock will draw 6 per cent. cumulative dividends and can be retired as a whole at $115 a share or in part at $120. Each present holder of one share of preferred will receive $110 in cash, with the privilege of subscribing at $100 a share for the preferred stock of the new company up to 110 per cent. of his present holdings. Each holder of one share of common stock of the present company will receive 1 4-5 shares of new common stock and 45-100 of a share of new preferred. The company has car wheel foundries in Chicago, Boston, Detroit, Denver, St. Paul, Tacoma and Kansas City.

Dividends Declared

The Emerson-Brantingham Company, regular quarterly, 1¾ per cent. on the preferred stock, payable November 1.

The Cambria Steel Company, quarterly, 1¾ per cent., payable November 15.

The Pennsylvania Steel Company, regular semi-annual 3½ per cent. on the preferred stock, payable November 1.

Personal

Among those elected to membership in the Iron and Steel Institute at the recent meeting at Leeds, England, are the following: Frederick M. Becket, electro-metallurgist, Niagara Falls, N. Y.; Charles Reginald Bulley, electro-metallurgist, Syracuse, N. Y.; Joseph Dix Fraser, general manager Atikokan Iron Company, Port Arthur, Ontario; James H. Herron, consulting metallurgical engineer, Cleveland, Ohio; Edward F. Kenney, metallurgical engineer, Johnstown, Pa.; Sidney John Moore, steel manufacturer, South Milwaukee, Wis.; Charles Glidden Osborne, Illinois Steel Company, Chicago; C. F. W. Rys, metallurgical engineer, Pittsburgh; Howard J. Stagg, Jr., metallurgist, Halcomb Steel Company, Syracuse, N. Y.

W. R. Haynie, 30 Church street, New York, has just returned from abroad, having concluded arrangements to represent Carels Frères, of Ghent, Belgium, in the United States. They are builders of the Carels-Diesel engine.

A. L. Roberts, for five years with the Pawling & Harnischfeger Company, Milwaukee, Wis., as designer and mechanical engineer, is terminating his connection with that company. Previous to his Milwaukee engagement he was with the Morgan Engineering Company for about 18 years. He has not decided as to his future movements.

W. H. Foster, president, and A. C. Tobin, manager of sales for the General Fireproofing Company, Youngstown, Ohio, have started on an extended trip to Europe to advance the interests of the company abroad. They will be absent six weeks to two months. The products of the company—metal furniture, steel lath and reinforcing—are already extensively used abroad, but the foreign business is believed to be capable of much greater expansion.

Albert J. Jones, formerly with the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, has accepted the position of secretary of the Acme Machine Tool Company, of that city, vice J. H. Williams, who recently resigned to engage in other business.

D. B. McClelland, vice-president and treasurer, and George Matheson, Jr., general manager, of Spang, Chalfant & Co., Inc., Pittsburgh, have gone to the Pacific coast on a business trip to be absent until about December 1.

S. A. Benner, formerly assistant to President Wallace H. Rowe of the Pittsburgh Steel Company, Pittsburgh, has resigned.

John D. W. Snowden is now representing the Cambria Steel Company in the Michigan territory with headquarters in Detroit, succeeding H. H. Pleasance, resigned. Michigan is part of the territory of the Cleveland office of the company.

Charles E. Carpenter, recently appointed general manager of the Allied Machinery Company of America, to succeed Capt. G. L. Carden, sailed for Europe October 22. Mr. Carpenter will stay for an indefinite time in Europe, making his headquarters at the office of the company in Paris.

S. G. Gilfillan, for over 30 years secretary and treasurer of the Belfont Iron Works Company, Ironton, Ohio, was elected president and general manager at a meeting of the directors October 16, succeeding Barton H. Burr, recently deceased. John Peebles continues as vice-president. John R. Gilfillan was elected secretary and C. W. Moulton, treasurer; both have been members of the office force for a number of years. E. W. Bixby of the First National Bank is a new member on the board. S. B. Steece was made a director of the Ashland Steel Company to take the place of Mr. Burr upon the board of that organization.

L. L. Jewell, who went to the Isthmus of Panama two years ago to prepare for the McClintic-Marshall Construction Company, Pittsburgh, its bid for the construction of the lock gates, and has been in charge of the erection since May, 1911, has resigned from the service of the company to become president and chief engineer of the Central American Construction Company, a corporation recently organized under the laws of the republic of Panama, to carry on a general contracting business. He has been succeeded as Pittsburgh manager by W. M. Sterrett, manager of the plant at Pottstown, Pa. J. C. Childers will be associated with Mr. Sterrett as superintendent of erection.

W. H. Garber, manager of the Dawes and Myler works of the Standard Sanitary Mfg. Company at New Brighton, Pa., has been elected a director of the Beaver County Trust Company.

Victor C. Lassen has severed his connection with the Vanadium Metals Company and the Victor Metals Company, both of Pittsburgh.

Giorgio E. Falck, Milan, Italy, president Associazione fra gli Industriali Metallurgici Italiani, is a visitor in the United States in connection wth the fifth International Congress of Chambers of Commerce and Industrial Associations. Mr. Falck was recently elected an honorary member of the American Iron and Steel Institute.

Axel F. Wahlberg, the well-known Swedish steel metallurgist, is making a tour of the steel manufacturing centers of the United States.

Obituary

HORACE INMAN, president Inman Mfg. Company, Amsterdam, N. Y., died October 16, aged 73 years. He was born in Herkimer County, New York, and early in life gave evidence of a bent toward inventions. He made a paper box of unique form when he was eight years old, and this proved to be the field in which he was to become successful. This box is still in possession of the Inman Mfg. Company. In 1874, when he embarked in the manufacture of paper boxes, he bought a small factory, which has now grown into an extensive plant. For a long time he was his own foreman, and about 1882 he began to build machinery for his own use. He was the pioneer in the field of automatic and semi-automatic paper box making machinery, inventing and patenting an almost endless variety of machines. He leaves two sons and a daughter.

JOSEPH P. MANTON, Providence, R. I., founder of the American Ship Windlass Company of that city and inventor of the steam method of raising anchors and steering ships, died August 15, aged 81 years. After graduating from Smithfield Academy and the Providence high school he learned the trade of machinist, and in 1849 went to California after gold. Returning East, he founded the American Ship Windlass Company in 1857. At the outbreak of the Civil War he enlisted as a private and left the army a colonel. His inventions were many in addition to the steam windlass. He retired from business some years ago.

WILLIAM B. JONES, former auditor of the Youngstown Sheet & Tube Company, Youngstown, Ohio, died October 6, at a sanitarium in Cuyahoga Falls, Ohio. He had been ill over a year and it was on this account that he resigned at the expiration of the last fiscal year. He had been associated with the company ever since it began business and was interested in it financially. He was born February 19, 1854, in Youngstown, where he spent his entire life. His father, Thomas Jones, was a furnace builder.

The Car Shortage.—The statement of the American Railway Association shows that on October 10 the car shortages on 179 roads in the United States and Canada were 54,389, while the surplus cars numbered 22,810. The net shortage was thus 31,579 as against 17,790 on September 26. On October 11, 1911, there was a surplus of cars, the number idle being 35,897. Illustrating present conditions on some roads is the fact that at the recent annual meeting of the Illinois Central stockholders several representatives of coal companies complained bitterly of their inability to get sufficient cars. In the answer of the management it was said that the Illinois Central bought 500 coal cars last winter and 2500 more subsequently, but had just begun to get deliveries on these orders. The meeting approved a resolution for the ordering of 6000 additional coal cars.

The Carpenter Steel Company, Reading, Pa., will build a small open-hearth furnace for the melting of special grades of steel.

No. 2 furnace of the Rogers-Brown Iron Company, Buffalo, N. Y., which has been out for relining, was again blown in October 17.

Pittsburgh and Vicinity Business Notes

The Wheeling Mold & Foundry Company, Wheeling, W. Va., has received a contract from the recently organized Wheeling Sheet & Tin Plate Company for 10 28 x 30-in. hot tin mills complete, 12 26 x 36-in. cold mills with gear drive, 10 38-in. motor-driven doubling shears, 10 42-in. belt-driven squaring shears, and 400 net tons of 4 x 4 x ⅜-in. floor plates.

The Apollo Sheet Steel Company, which is building a six mill plant at Apollo, Pa., expects to be operating soon after January 1. Two galvanizing pots will be installed. The product will be black and galvanized steel sheets.

E. E. Gregg has been appointed receiver of the Penn Motor Company, New Castle, Pa.

The Pittsburgh office of the Babcock & Wilcox Company has received an order from the Carbon Steel Company for 600-hp. Rust water-tube boilers.

The American Engineering Company, 2439 Oliver Building, Pittsburgh, reports, among recent orders for Taylor stokers, one for 900 hp. from the Bessemer Coal & Coke Company, Russelltown, Pa. These stokers will be used to burn bone coal, which has heretofore been thrown away. Combining the principle of underfeeding with the automatic cleaning of the fire, they are especially adapted for such fuel.

Samuel W. Hays' Sons, Keenan Building, Pittsburgh, have taken orders for Whiting cranes as follows: Carnegie Steel Company, 14 6-ton electric jib cranes for the Braddock works and 2 for the Clairton works; Brier Hill Steel Company, Youngstown, Ohio, 7 similar cranes; Northwestern Ohio Natural Gas Company, Sugar Grove, Ohio, a 20-ton 80-ft. span electric traveling crane; Allegheny shops, Pennsylvania Lines, a 200-ton electric locomotive hoist.

Shipments are now being made by the Westinghouse Electric & Mfg. Company, East Pittsburgh, of 15 electric locomotives for the Southern Pacific Railroad Company, to be used on its trolley systems in Los Angeles and other California cities. The steel portions of the locomotives are made by the Baldwin Locomotive Works, Philadelphia, and then sent to Pittsburgh for assembling and for the electric equipment. The cost of each locomotive ranges from $15,000 to $30,000. The total amount involved in the locomotive and car orders is about $700,000.

The Baird Machinery Company, Pittsburgh, will vacate the building at 123-125 Water street, which it has occupied for 40 years, and will remove into its new building on the corner of Water street and Penn avenue shortly after January 1. The new building is 128 x 134 ft., eight stories, and is of reinforced concrete construction.

At the meeting of the Pittsburgh Foundrymen's Association on Monday evening, October 14, Thomas D. West read a paper on "The Menace of Scarcity in Common Labor." The point was made that with the modern tendency to avoid trades involving hard work the scarcity of labor in the foundry and other industries is likely to become more aggravated, "with a resulting high wage rate for those willing to do hard, unpleasant work of life, while those who want clean and easy work with little or no responsibility must accept low wages if civilization is to escape panics, privation and revolution."

W. N. Kratzer & Co., structural steel fabricators, have removed their offices from the works at Thirty-third and Smallman streets, Pittsburgh, to Thirty-second and Smallman streets. The space formerly occupied by the offices will be used for enlargement of the works.

The Duff Mfg. Company, Pittsburgh, builder of hydraulic lifting jacks, is making good progress on the erection of its new plant. The main building, 495 ft. long and 125 ft. wide, will require about 500 tons of steel for the framework and will be equipped with Lupton sash. The roof will be of concrete of the self-centering type. The office building will be 60 x 85 ft., of reinforced concrete construction. Electricity will be utilized for power, but contracts have not yet been placed. The Erie City Iron Works, Erie, Pa., has installed two 100-hp. Erie City water tube boilers.

The Mesta Machine Company, Pittsburgh, whose works are located at West Homestead, Pa., is erecting in its

shops a large engine of the compound reversing type, to be used for driving a blooming mill for the Youngstown Sheet & Tube Company, Youngstown, Ohio, which will shortly be ready for shipment. The two bedplates of the engine weigh 120 tons each, and two special cars will be used in shipping them. The total weight of the engine will be about 1,500,000 lb. The Mesta Company has sufficient orders on its books and enough business in sight to practically insure the operation of its plant to full capacity for all of next year.

Crude Oil for Fuel in Mexico

Through the use of oil Mexican manufacturing and power plants are now in a position to cut their fuel cost away below what it has been in the past. Since 1910 the production of oil in Mexico has been so large as to make the marketing of the output a big problem. Manufacturers there are at last beginning to realize the importance to them of this vast amount of oil, as it can be purchased in some places as low as 38 cents a barrel by large consumers.

The Compania Fundidora de Fierro y Acero de Monterey (Monterey Iron & Steel Company), Monterey, is the first steel maker to start using this cheap fuel. After a thorough investigation of different burners and appliances for the burning of oil, the company has let a contract to Tate-Jones & Co., Pittsburgh, Pa., for the complete installation of an equipment of burners, pumping systems, meters, reducing valves, reversing apparatus, etc., to burn crude oil under 5000 hp. of boilers, also in the reheating furnaces for the rolling mills, in the open-hearth furnaces and in the soaking pits.

On May 20, 1911, a tank steamer cleared from Tampico with the first cargo of crude oil and during that year the total shipments amounted to 806,916 barrels. The shipments by water for the month of September of this year from Tampico and Tuxpam, alone, amounted to over 700,000 barrels. These facts show the rapid progress that has been made in handling this product. Although the tremendous output of the Mexican fields has not yet affected our Eastern and Central markets, due to the lack of transportation facilities, Mexican crude oil is rapidly supplanting the domestic product in the fuel oil markets of our Gulf coast States. Even with the advance that has been made in shipping facilities, the Mexican oil fields are not being worked to anywhere near their capacity and Mexican manufacturers have a cheap fuel at their doors for many years to come.

An English All-Electric Steel Plant

As a result of some two years' experience in electric steel melting furnaces, the Stobie Steel Company, Foster's Buildings, High street, Sheffield, England, is building a new steel works in which all the melting and further treatment of the steel will be electric. This will be the first big steel works in Great Britain solely engaged on the electric manufacture of tool steels, alloy steels and similar material. The new works is being erected on the Tyne side, as current can be obtained on the northeast coast under more favorable conditions than in Sheffield.

The installation will at first consist of a 15-ton, 3-phase steel melting furnace; a 5-ton, 2-phase furnace for special steels, and a 3-cwt. alloy melting furnace. All these furnaces are designed and built by Victor Stobie, who has made a special study of electric steel furnaces from the metallurgical point of view, while maintaining all electric requirements and improvements which help to make the furnace a good load for the power station. A 2-ton Stobie patent electric steel melting furnace is shortly to be built for another Sheffield steel works and a 15-ton furnace is also projected for a steel works in the northern part of the country.

Bureau of Standards Analyzed Samples

The Bureau of Standards, S. W. Stratton, director, Washington, D. C., is now prepared to issue pure sodium oxalate for use as a standard in oxidimetry, in bottles containing 120 and 200 grams, the fees for which are respectively $2 and $3. With each sample is furnished a certificate giving the purity of the material together with brief directions for its use in the standardization of permanganate solutions.

Circular No. 40, on "Sodium Oxalate as a Standard in Volumetric Analysis," is now ready for distribution and will be sent on request. It includes a description of properties, preparation and testing of sodium oxalate, and a discussion of its suitability as a standard in oxidimetry and acidimetry.

The fourth edition of Circular 25, "Standard Analyzed Samples—General Information," is now ready for distribution. Attention is called to the fact that the fee for sample No. 24, vanadium steel, has been changed from $2 to $2.50.

Chrome-tungsten Steel, No. 31, is now ready for distribution.

Device for Stopping an Internal Combustion Engine.—An automatic device for stopping internal combustion engines in case of lack of cooling water, designed by J. H. Stroganoff, Twer, Russia, was recently illustrated in Die Gasmotorentechnik. According to a translation in the September Journal of the American Society of Mechanical Engineers, the valve in the fuel piping of the motor is connected, by means of a chain running over suitable supports, to a vessel into which flows water from the cylinder jacket. When everything is in order, part of the water flows over the edge of the vessel while the rest escapes through little openings in the bottom of the vessel, which being full occupies the lowest position, the fuel valve being open. When the flow of water ceases and the vessel empties, a counterweight on a horizontal lever runs out to the end of the arm, as the arm tilts, and gives a moment sufficient to move the chain and close the fuel valve. The scheme is, of course, to prevent the overheating of the engine.

The welding of aluminum and copper, respectively, by the oxy-acetylene process without causing oxidation, was described by M. S. Plumley, Oxweld Acetylene Company, People's Gas Building, Chicago, Ill., in a paper presented before the Association of Iron and Steel Electrical Engineers at its annual convention at Milwaukee, Wis., October 1, entitled "The Accomplishments and Possibilities of the Oxy-Acetylene Process." In welding aluminum a flux of lithium, potassium and sodium chlorides was used. With copper the tendency to oxidize is taken care of by covering the surface of the plate with a mixture of potassium phosphate in potassium carbonate to a depth of about ⅛ in. and 12 in. wide in each side of the seam. Upon application of the flame the mixture will melt and form a glaze over the surface of the metal, preventing oxidation.

The Lake Erie Nail & Supply Company, Cleveland, Ohio, has changed its name to the Lake Erie Machinery & Supply Company. About 18 months ago the company began to handle machinery in addition to its other lines, and its machinery department is now a very important part of its business. It is prepared to take on additional products in the line of general machinery and metal and wood working tools with a view to further extending the scope of that department. The increase in its business has made its present quarters inadequate and it contemplates providing considerable additional floor space in the near future. No changes have been made other than the adoption of a new name.

The August report of the Bureau of Foreign and Domestic Commerce, Department of Commerce and Labor, just issued, shows the total value of exports of iron and steel and manufactures thereof in that month was $25,450,107, against $24,913,052 in July; imports, $2,549,115, against $2,476,741. The total exports of commodities for which quantities are given were 282,432 gross tons, as compared with 272,898 tons in July. The imports of similar commodities totaled 20,842 gross tons in August, as compared with 17,902 tons in July. The imports of iron ore in August were 178,828 gross tons, against 185,677 tons in July.

New Publications

Concrete Costs—By Frederick W. Taylor and Sanford E. Thompson. Bound in cloth. Size, 5 x 8 in.; pages, 709; 76 illustrations and 166 tables. Published by John Wiley & Sons, New York City. Price, $5 net.

The field of this book, which is designed to meet the needs of the contractor as well as the engineer and architect, is so broad that it has necessitated the treatment of unit times and costs of concrete construction from the standpoint of rough approximate estimates, accurate detailed estimates, economical layout of work and scientific management with tasks and bonus. The times and costs are based upon average conditions and workmen instead of on scientifically managed operations, but a marked development is taking place in the direction of better organization and close attention to the small details of estimating and management. For this reason the matter in the book has been minutely subdivided. Many suggestions bearing on the practical introduction of systematic methods in the construction operations are presented in the work.

Approximate costs of miscellaneous concrete work and cost data are presented in chapters I and II which is intended as a guide in making rough estimates. Approximate costs of reinforced concrete buildings are given in Chapter III. in terms of cost per square foot of floor surface and there are included in this chapter tables and curves which cover a wide range of areas and types of buildings and serve to give a general idea of the probable cost of a complete building. General labor costs are discussed in the next two chapters and the proportioning of concrete is taken up in Chapter VI, which discusses the subject chiefly from the standpoint of economical selection and proportioning of materials. Quantities of material and their cost on the cubic yard basis are given in the tables contained in the next two chapters, while the labor cost of the operations of preparing the materials and mixing them are treated in Chapters IX to XIII inclusive. These chapters cover the excavating and crushing of stone for concrete, the handling and transporting of materials, the mixing of concrete by hand, the layout and cost of plant and the cost of mixing concrete by machine. In the chapter on plant cost brief descriptions of actual layouts are given and this information should prove of material value in preparing economical designs for concrete plants. Form construction is treated with considerable detail in the three succeeding chapters, while the remaining eight chapters consist principally of tables for use in the preparation of form designs and estimates. A special feature of the last chapter is an outline for making up estimates on building construction which includes examples showing the methods of using the tables of volumes and of time and cost in practical work.

Science of Organization and Business Development. By Robert J. Frank, LL.B. Leather, 280 pages. Published by the author and for sale by the David Williams Company, New York City. Price, $2.75.

Mr. Frank's book is a practical treatise on the promotion, organization, reorganization and financing of business corporations. It is practical, because a general discussion of its subjects is of more value than an extended discussion of details involving circumstances or conditions which may never be met in a given business venture. The organizers of a business corporation will find in it material of great value. As the author says, "more money has often been made or lost through the plans adopted for financing, organizing or reorganizing a business than in its operation; at the same time mistakes in such plans often prevent well-merited success or occasion individual sacrifice." He describes in a legal, practical way how to organize a corporation and where to organize it. The latter is of importance because of the difference in the laws regarding business in different states, some offering more favorable franchises than others.

That the organizer may better understand questions of corporation finance, the author has devoted himself in part to explanations of the terms capital, bonds and stocks, also to capitalization and methods of raising additional capital. "If the corporation is legally formed," he says, "with due consideration for its possible future developments and financial needs, and the business has been legitimately and successfully conducted, and its books and records accurately kept, the question of raising additional capital is comparatively a simple one," but, "when the corporation is confronted with embarrassing questions of finance, the defects, if any, in its formation or subsequent conduct, stand out in bold relief and often make it quite impossible to accomplish the result desired without a reorganization."

The work is also a guide to directors, accountants, officers in an established business, financiers and also to the lawyer interested in corporation practice. The author recommends that "a safe rule for the director to adopt is to act in all things pertaining to his office and the company of which he is such a director, in the same way as he would act if the business transacted for the corporation was his own exclusively." Separate chapters are given to the reorganization and consolidation of enterprises and the promotion of enterprises.

An appendix contains contract forms, by-laws and resolutions, certificates, rules governing listing of stocks and bonds, a synopsis of the corporation laws of several different states and tables showing earnings on stocks and bonds. It is a work that is sure to help one responsible for the welfare of a business organization.

Modern Illumination, Theory and Practice—By Henry C. Horstmann and Victor H. Tousley. Bound in flexible leather. Size, 4½ x 7 in.; pages, 273; 42 illustrations and numerous tables. Published by Frederick J. Drake & Co., 1325 Michigan avenue, Chicago, Ill. Price, $2.

This book is intended for the practical workman rather than the student of mere theoretical considerations. The aim in preparing this handbook of practical information for users of electric lights, architects, contractors and electricians has been to include all of the theory which was needed to give the reader a thorough comprehension of the underlying principles and to dwell with particular emphasis upon the practical points that must be considered in the laying out of illumination. Among the special features of the book are a chapter dealing with the preparation of plans and specifications and one which is intended to suggest all the peculiar and general requirements obtaining in various sections of the country.

After a discussion of the various kinds of light, the principles of vision, reflection, refraction and diffusion, and photometry, the calculation of flux from photometric curves and illumination calculations are taken up in chapters V and VI. The characteristics of electric illuminants are touched upon in the following chapter, after which the subjects of shades and reflectors, location and hight of lamps, color of light and choice of lamps and fixtures are discussed. Considerable attention is paid to indirect lighting and there is a table showing the distance from the ceiling to the top of the reflector in rooms of various sizes. Tables of intensity for various classes of service, illumination, incandescent light wiring and of square roots and standard symbols are included, together with glossary of terms and phrases.

Energy and Velocity Diagrams of Large Gas Engines. By Paul L. Joslyn. Pages, 70; diagrams, 62. Published by the Gas Engine Publishing Company, Cincinnati, Ohio. Price, $2.

In this book are given data and methods of high value to the designer and manufacturer of large gas engines. So many features of large gas-engine construction must be considered before any part of it is made that an exact design should be prepared before construction is attempted. In small engine work changes can be made and faults remedied quite cheaply even after the engine is partly constructed. The loss would be serious if the same plan was followed in large construction work.

All technical terms used in the book are fully explained, thus making it very easy to follow the author's methods. He gives at length the methods of laying out velocity and pressure diagrams for large engines operating on producer, natural or blast-furnace gas, with instructions how to use them. A comprehensive study is made of the construction of the indicator card for two and four-cycle engines of large type. The data given are the result of actual designing of the largest engines in both Europe and America.

German Labor Statistics

The September 1 Bulletin of the American Association of Commerce and Trade, Berlin, gives "by permission of A. E. Dunning" the following statistics showing the average earnings and hours worked per day of certain classes of labor in Germany (a mark being equal to 24 cents in United States currency):

Coal Mining.

Kind of labor.	Westphalia. Marks per day.	Lower Silesia. Marks per day.	Hours per day.	Remarks.
Cutters	5.63	3.63	8	Three shifts.
Master cutters	5.63	3.63	8	
Shiftmen	4.02	3.12	8–10	Shiftmen regularly employed work 8 hours; others 10 hours.
Leaders	4.13	3.47	8	
All other labor on picking belts	4.13	3.47	8	
All kinds of surface labor	4.13	3.47	8	Shiftmen not regularly employed; work 10 hours per day.

The rates of wages paid in different parts of the German Empire vary. Miners in Westphalia are considerably better paid than those in Lower Silesia.

Coke Making.

Kind of labor.	Marks per day.	Hours per day.	Remarks.
Top-fillers	2.50 to 3.00	12	Every 14 days the shift is changed; i. e., the men work 2 weeks in day time and 2 weeks in the night. On the day the change is made the men are obliged to work 18 to 24 hours.
Levelers	2.50 to 3.00	12	
Drawing and loading	2.50 to 3.00	12	
All other labor in both coke making and coke ovens.	2.50 to 3.00	12	In the coke making branch, no distinction is made in the men as to kind of labor. They are all called "tagelöhner" (day laborer).

The average wages paid to all engaged at coal washeries are the same as those paid in coke making, namely, 2.50 to 3.00 marks. The hours worked per day are eight.

Blast Furnaces.

Kind of labor.	Average per day reckoned according to: Time. Marks.	Tonnage. Marks.	Hours per day.
Ore mixers	3.90	4.80	12
Men serving furnace-top	4.10	4.60	12
Melters	4.10	4.70	12
Oven-men	4.10	4.70	12
Men serving apparatus, etc.	3.90	....	12
Common labor, including all engaged in this branch	3.50	4.50	12

Open Hearth Department.

Kind of labor.	Average per day reckoned according to: Time. Marks.	Tonnage. Marks.	Hours per day.	Remarks.
Foreman	....	....	12	*Wages paid monthly; amounts unknown.
Second foreman	....	....	12	
First, second and third melters	5.40	6.40	12	
Crane man	4.40	4.90	12	
Casting-pit men	4.70	5.70	12	
Helpers and common labor	4.10	4.30	12	
Loading scrap and handling slag, etc.	4.20	5.00	12	

* Foreman not classed with day laborers (tagelöhner). Later information is that the foreman receives 10 to 14 marks per shift and the second foreman averages 10 marks per shift.

Basic Bessemer Process.

Kind of labor.	Average per day reckoned according to: Time. Marks.	Tonnage. Marks.	Hours per day.	Remarks.
Foreman	10.00	12.50	12	In some localities the 8-hour shift is being introduced.
Blowing engine engineer	8.50	11.00	12	
Lime and dolomite men	4.30	5.80	12	
Stampers	4.30	5.80	12	
Masons	4.30	5.80	12	
Iron-slag-chip-carriers	3.80	5.20	12	
Mixers	4.20	5.70	12	
Converters	4.80	6.00	12	
Furnacemen	4.90	6.00	12	
Casting-pit-men	4.90	6.00	12	
Helpers	4.10	4.50	12	
Machinists	4.00	5.20	12	
Cranemen	4.00	5.20	12	

The Dennison Mfg. Company's New York Stores

The Dennison Mfg. Company, which for 68 years has made tags for all trades, has rented the large store and basement corner of Twenty-sixth street and Fifth avenue, New York, and will establish its uptown headquarters there about the middle of November, still retaining its downtown office at 15 John street.

This company is unique among manufacturing concerns not alone for the great variety and interesting character of its products but because of a novel system of profit-sharing among its employees. By this system, the principal employees, who are eligible if a certain length of service and salary is theirs, become stockholders, receiving each year their share of "industrial partnership stock," accruing from the surplus earnings after specific dividends and sums are provided for. The factory is at Framingham, Mass., where a force of 2500 is employed. The company has stores in Boston, Philadelphia, Chicago and St. Louis, as well as the two in New York, and sales offices all over the country.

Number of Plants Working with 9-hour, 10-hour and 12-hour Shifts, Number of Men Engaged in Each and Percentage.

Kind of plant.	Working time. 9 hours and less. Plants.	Men.	10 hours. Plants.	Men.	10½ and 11 hours. Plants.	Men.	12 hours. Plants.	Men.	Percentage of workmen engaged in each shift. 10 hours. and less.	10½ and 11 hours.	12 hours.
Blast furnace	3	980	11	2,536	2	148	53	11,401	23.08	0.99	75.93
Bessemer and Thomas	..	....	2	163	1	5	21	2,774	5.54	0.17	94.29
Open hearth furnace	..	....	12	1,677	..	50	53	6,958	19.30	0.58	80.12
Puddle works	1	116	2	72	1	6	22	989	15.89	0.51	83.60
Rail and structural mills	..	....	4	521	..	....	16	1,675	23.72	....	76.28
Bar mills	..	....	5	607	1	....	17	1,380	29.20	4.42	66.38
Rod mills	..	15	31	2,944	7	1,630	87	6,811	25.95	14.30	59.75
Sheet mills	6	1,291	22	3,204	2	1,193	42	4,380	44.65	11.85	43.50
Pipe mills	..	....	30	3,722	..	30	4	513	87.27	0.70	12.03
Wire rolling mills	..	....	6	742	2	130	12	928	41.22	7.22	51.56
Wire drawing mills	..	....	6	897	2	824	3	1,133	31.43	28.87	39.70
Flatting mills	..	....	25	1,388	3	217	20	2,353	35.07	5.48	59.45
Machine and wagon factories	..	....	8	1,459	..	....	..	....	100.00	....	....
Iron construction and bridge building	..	....	9	2,242	3	726	4	392	66.73	21.60	11.67
Repair shops	3	1,052	124	10,273	17	1,085	40	3,035	73.32	7.03	19.65
Iron and steel castings	2	341	88	10,179	7	482	17	3,102	74.59	3.42	21.99
Pressing and stamping works	..	....	5	310	2	123	2	147	53.45	21.21	25.34
Forging works	..	....	21	1,508	3	62	3	1,132	55.81	2.29	41.90
Small iron fittings works	..	....	18	1,504	2	196	2	80	84.50	11.01	4.49
Wrought iron works	1	150	16	1,306	3	162	1	125	83.54	9.29	7.17
Galvanizing works	..	20	12	912	1	155	3	338	65.21	10.94	23.85
Machine and crane works	..	....	25	1,533	2	53	52	4,786	24.06	0.83	75.11
Railroad works	..	72	8	358	1	22	18	1,851	18.67	0.96	80.37
Plant construction	..	....	11	857	..	....	10	1,033	45.34	....	54.66
Total	16	3,979	501	50,914	62	7,391	502	57,316	45.90	6.18	47.92

Rolling Mills.

Kind of labor.	Average per day reckoned according to: Time. Marks.		Tonnage. Marks.		Hours per day.	Remarks.
Rollers	4.20	5.00	6.70	9.00	12	In some plants the 8-hour shift has been introduced
Roughers	4.00	5.00	4.80	5.00	12	
Second Roughers	4.00	5.00	4.80	5.00	..	
Catchers	4.20	5.40	5.00	5.90	..	
Shearmen	3.80	5.80	4.50	6.00	12	
Hot sawmen	3.50	4.20	4.50	5.00	12	
Loading	3.10	3.80	4.00	5.00	12	
Boiler firemen	4.20	...	5.50	...	12	
Ash-wheelers	3.10	...	5.00	...	12	

The report that Alice furnace of the Valley Mold & Foundry Company at Sharpsville, Pa., has been banked on account of shortage in supply of coke is incorrect, as the furnace has been operating steadily since October 2.

The Steel Package Company

The Steel Package Company, 17 Battery place, New York, has been incorporated with $9,500,000 under Federal laws to manufacture barrels, boxes, crates and other containers of sheet steel under patents owned by the company. Lewis Nixon, president of the company, announces that it has definitely decided to locate its initial plant in Jersey City. Several sites are now under consideration, and it is expected to begin the work of equipping a plant to turn out 20,000 barrels per day within a month. This plant is to be the first of a system of works to be located in the larger shipping centers of the United States, including Chicago, Pittsburgh, Kansas City and Seattle. A subsidiary company has been organized in Canada to take care of the company's Canadian trade. The principal product of the company at the outset will be a barrel made of pressed steel staves and heads interlocked by key strips of steel. The binding of the barrel is of the ordinary steel hoop type, the whole design to be collapsible and shipped in knock-down shape. There are many advantages claimed for the barrels, such as great strength, tightness, compactness in shipping and low cost to the consumer. The officers of the company are: President, Lewis Nixon; vice-president, Walter S. Penfield; secretary, Ira E. Bennett, and treasurer, Lewis Spinks.

The Chambers of Commerce Congress

The Fifth International Congress of Chambers of Commerce, which opened its sessions in this country at Boston, Mass., September 24, subsequently taking a tour which extended to Chicago and Cincinnati, was finally entertained, October 18, by the commercial organizations in the city of New York. In the morning the visitors from abroad were taken on a steamboat trip around New York harbor; at noon they were entertained at luncheon by the Chamber of Commerce of New York; in the afternoon a meeting was held in the United Engineering Societies Building, where addresses of welcome were made, and in the evening they were given a dinner at Sherry's. John Claflin, president of the Chamber of Commerce of New York, and Henry R. Towne, president of the Merchants' Association of New York, were conspicuous among those who extended official greetings to the visitors. Representatives of foreign chambers of commerce were effusive in expressing their high appreciation of the cordiality with which they had been received throughout this country.

C & C Electric & Mfg. Company Succeeds Garwood

The C & C Electric & Mfg. Company has purchased the good-will, patents and other assets of the Garwood Electric Company and will continue the manufacture of the special lines of electric apparatus developed by that company and by its predecessor, the C & C Electric Company. Notwithstanding these changes of name, the factory at Garwood, N. J., has been in continuous operation for nearly 20 years, some of the employees having been identified with the business when the manufacturing was done in New York before removal to Garwood, while the records of the business run back to 1882. It is, therefore, one of the oldest electrical manufacturing enterprises in the country. Its specialties will include planer motors, newspaper press drives, electric welding sets, wireless equipments and slow-speed motors for modern steam-heating and ventilating systems. The company will not manufacture machines of large capacity, but will confine its energies to the manufacture and sale of its specialties. Alexander Chandler is president; Edward D. Floyd, vice-president; Charles L. Hyde, treasurer. These, with John A. Montgomery and B. W. Johnson, constitute the board of directors. The capitalization consists of $250,000 7 per cent. cumulative preferred and $250,000 common stock, and there is no bond issue or other lien on the property.

The Wheeler Condenser & Engineering Company, Carteret, N. J., has opened an office in Cleveland, Ohio. The office will be under the management of Walter G. Stephan, 1325 Citizens Building.

Massachusetts Savings Bank Life Insurance

The State Actuary of Savings Bank Life Insurance, Boston, Mass., announces a reduction in the rates of the straight-life and 20-payment life policies for $500, effective November 1, 1912, the beginning of the fiscal year of the savings insurance banks. This reduction was made after consultation with leading New York actuaries when it was unanimously agreed that the reduction could be made. The change is to be retroactive; premiums on policies already issued, as well as new policies, will be on the basis of the reduced rates. The amount of the reduction varies at different ages, but on a straight life policy for $500 at age 50 the reduction amounts to $1.88; on the 20-payment for the same amount and age the reduction amounts to 96 cents.

The premiums on the 20-year endowment policies issued by the savings banks are already much lower than those of regular companies, and this reduction on the straight life and 20-payment life policies also makes these policies considerably lower. These low rates are for the special benefit of workingmen.

Blair Ports.—A pamphlet has been issued by the Blair Engineering Company, 17 Battery place, New York, entitled "Blair Ports," containing illustrations in colors. The Blair port, as used in a modern open-hearth furnace, was first described in the issue of *The Iron Age* of April 8, 1909. A hollow steel hood, water cooled, completely covers the gas port of an open-hearth furnace, permitting the entire block of the furnace to be built of magnesite in a basic furnace and of silica sand in an acid furnace, and forming a septum, or barrier, between the incoming gas and air, impervious to the gases and physically and chemically inert, so that the whole end construction of the furnaces becomes practically indestructible, and thus, by properly controlling at all times the mixture and direction of the gases, greatly retards the burning out of the furnace. Among the steel companies having one or more furnaces equipped with Blair ports may be mentioned Bethlehem, Southern, Pittsburgh, Lackawanna, Lukens, Maryland, Illinois, National Tube, American Steel & Wire, Atlanta and Nova Scotia Steel & Coal.

Booklet on Selecting Grinding Wheels.—The Brown & Sharpe Mfg. Company, Providence, R. I., has published a 40-page book entitled "Points about Grinding Wheels and Their Selection." It contains desirable information for the operator of grinding machines or those interested in the buying of grinding machines or wheels. It defines and describes the different abrasives and gives suggestions to enable one to select the proper wheel for any given job. Hints are given to the operator on the mounting, balancing and truing of wheels and also the effect of water on them. Clear dimensional cuts are used and views are presented of grinding wheels and grinding machines.

At Trenton, N. J., the Alabama Consolidated Coal & Iron Company has filed application for the discontinuance of the Attorney General's suit attacking as unlawful the company's issue, several years ago, of $3,500,000 bonds to replace preferred stock. It is claimed that the suit was started at the instance of third parties, that it has not been pressed since the papers were filed, and that it interferes with the proposed reorganization of the company. It is announced that H. E. Coffin, trustee in bankruptcy, has arranged for the sale of $100,000 of one-year certificates to be used in part in payment of wage claims which had accrued prior to the placing of the company in bankruptcy.

The status of the gas producer and of the internal combustion engine in the utilization of fuels is the subject of a pamphlet by Dr. Robert H. Fernald, published by the Bureau of Mines, Department of the Interior, Washington, D. C., and known as technical paper No. 9. It describes many applications of producer gas for heating and power purposes and gives the results of tests on different fuels in terms of the quantity of gas produced per pound of fuel. Several interesting tests are given of the application of the Diesel engine to marine use, also the various methods of utilizing the waste heat of the gas engine exhaust that have been attempted.

The Machinery Markets

If confirmation of widespread activity in the machinery markets were necessary it could be had from the general expressions of satisfaction at the recent large gathering in New York of machine tool builders and dealers. The latest reports continue to be good. The New York trade has done well in the past week and has excellent prospects, including a list of 30 tools from the Norfolk & Western Railway Company. New England continues busy and the feeling grows that machine tool prices will advance. Philadelphia has felt an improvement in the export trade. In Cleveland, where the labor shortage has become serious, there has been a large volume of single tool sales to widely scattered buyers and the demand is especially good for heavy automatic machines. The automobile trade has been doing some heavy, although quiet, buying in Cincinnati and the demand for boilers is noteworthy. Buying of small groups of tools caused satisfactory conditions in Detroit and the trade has confidence in the future. The building of new shops and additions in Chicago gives promise of excellent business, while current sales of a miscellaneous character have been good. In the Central South orders for power equipment have been plentiful; general machinery is in fair demand and the outlook good. The good run of trade has been maintained in St. Louis. Texas conditions are in accord with other centers despite the bad situation in Mexico. With inquiries increasing in number and importance there has been a satisfactory volume of business on the Pacific coast with sales of small tools predominating.

New York

NEW YORK, October 23, 1912.

Only expressions of satisfaction are heard from the New York trade when market conditions are discussed, and in most instances concrete facts are mentioned to support the assertions made. Actual need on the part of manufacturers in many lines continues to be almost invariably the cause of buying. The Norfolk & Western Railway Company has a list out for 30 machine tools. The General Electric Company has begun placing orders against its recently issued lists and the Frick Company, Waynesboro, Pa., has bought the tools it specified a few weeks ago. The Morrow Mfg. Company, Elmira, N. Y., in the last week made known requirements representing several thousand dollars' worth of machine tools and general equipment. The American La France Fire Engine Works, Elmira, N. Y., which is building a small addition to its plant, to be used principally for foundry purposes, has also been in the market as a purchaser. The American Locomotive Company has also been a buyer in the New York market. Other up-state manufacturers, including makers of valves, gas engines and pneumatic machinery, are generally busy. Meanwhile the prospects continue good, with an increase in the number of inquiries. A feature of the situation in the machine tool industry is a shortage of steel castings. A few months ago the foundrymen sought long time contracts for steel castings and machinery manufacturers were not willing to make them. Now the latter want the long time contracts, but the foundrymen demur and the desired contracts are not easy to effect because of the higher prices, and trend toward still higher, of steel and steel making iron, to say nothing of the founders finding current quick delivery business profitable, and sufficient to keep them busy. The Norfolk & Western list follows:

Norfolk & Western List

One 90-in. vertical boring mill, with two heads.

One 50-in. and one 36-in. vertical boring mills, with two heads each.

One horizontal drilling and boring machine, 42-in. bed, 3-in. spindle.

One motor-driven No. 4 universal milling machine.

One motor-driven 28-in. heavy-duty drilling machine.

One motor-driven 42 x 42-in. x 25-ft. planing machine, with reversible motor.

One motor-driven 24-in. x 6-ft. screw cutting lathe.

One motor-driven ¼ to 2½-in. pipe and nipple machine.

One belt-driven double head threading machine to take bolts up to 1 in.

One belt-driven 16-in. x 3-ft. screw cutting lathe.

One belt driven 18-in. shaping machine.

One 2500-lb. steam drop hammer.

One belt-driven 4-spindle drilling machine.

One belt-driven universal tool grinding machine.

One set of motor-driven Ajax scrap reclaiming rolls.

One motor-driven trimming press, with single main ram and side shear.

One 18-in. universal turret lathe for brass work.

One belt-driven 36-in. drilling machine.

One belt-driven 20-in. x 3-ft. screw cutting lathe.

One belt-driven 16-in. x 4-ft. screw cutting lathe.

One belt-driven 24-in. shaping machine.

One belt-driven 1½-in. single head bolt cutting machine.

One motor-driven 36-in. vertical boring and turning mill.

One belt-driven 24-in. shaping machine.

One motor-driven 62-in. vertical boring and turning mill with two swivel heads.

Two belt-driven 20-in. x 6-ft. screw cutting lathes.

One motor-driven 36 x 36-in. x 10-ft. planing machine with two rail heads.

One motor-driven 36-in. vertical boring and turning mill.

One belt-driven portable cylinder boring machine, capacity 18 to 25 in. and motor for driving.

One motor-driven Oster pipe machine, capacity ⅛ to 1¼ in., with five sets of dies.

The Spirella Corset Company, New York, which has an extensive manufacturing plant at Niagara Falls, N. Y., is having plans prepared for another factory building which it will erect and equip adjoining its present building.

Plans for a system of waterworks to be constructed by the town of West Winfield, N. Y., are being prepared by W. G. Stone, engineer, Mann Building, Utica, N. Y. Dr. Clarence F. Wood is chairman of the Water Board, West Winfield, and will receive bids.

The M. E. Blasier Company, Utica, N. Y., will build an addition 65 x 50 ft., two stories, to its brass works on Columbia street. The general contract has been let.

The Board of Contract and Supply, Frederick E. Johnson, secretary, Schenectady, N. Y., is receiving sealed proposals for shop tools and equipment for the Schenectady Technical High School in accordance with plans and specifications on file in the city engineer's office.

The Hornell Ice & Cold Storage Company, Hornell, N. Y., will build and equip a cold storage plant 120 x 416 ft., one to four stories, from plans of Cowan & Christenson, engineers, 4201 South Halsted street, Chicago, Ill.

The State Hospital Commission, T. E. McGarr, secretary, Albany, N. Y., is receiving sealed proposals for the construction of a power house, coal pockets, etc., at the Middletown State Homeopathic Hospital at Middletown, N. Y., from plans of Herman W. Hoefer, state architect.

The Shredded Wheat Company, Niagara Falls, N. Y., will in addition to building the supplementary factory now under construction erect a grain elevator of 110,000 bushels capacity from plans of the Monarch Engineering Company, Chamber of Commerce Building, Buffalo. Conveying machinery and equipment will be installed.

The Smith Organ Company, Tonawanda, N. Y., has been incorporated with a capital stock of $40,000 and will establish a plant for the manufacture of musical instruments. The directors are S. J. Elliott, P. H. Gombert and F. W. Smith, of North Tonawanda.

The Schoelkopf, Hartford & Hanna Company, Buffalo, N. Y., is building a three-story brick addition to its aniline works at Abbott road and the Buffalo River.

The American Malleable Company is having plans prepared for extensive alterations and additions to its Lancaster plant near Buffalo.

The Danahy Packing Company, Buffalo, has commenced the erection of a four-story fireproof cold storage plant, adjoining its packing house at Clinton and Metcalfe streets.

New England

BOSTON, MASS., October 22, 1912.

No one who attended the meeting of the National Machine Tool Builders' Association at New York last week would doubt the prosperity of the New England machinery and supply people, both manufacturers and dealers. Satisfaction with the present and full confidence in the future were unanimously expressed. The feeling that prices of machinery must advance presently is growing, the cost of manufacture having increased, and still being on the increase.

Plans have been completed for the consolidation of the Lowell Machine Shop, Lowell, Mass., and the Saco-Pettee Company, Newton, Mass., under the name of the Saco-Lowell Shops. The amalgamation is one of much importance to the machinery trade. Both houses are large manufacturers of textile machinery and are constant buyers of supplies and equipment. The Lowell Machine Shop now has $1,250,000 of 6 per cent. preferred stock and $1,000,000 common stock authorized. The Saco-Pettee Company has $1,600,000 of stock of one class. The headquarters of the new company will be in Boston. It will manufacture a full line of cotton and worsted machinery as well as many lines of machinery used in the cotton industry. The officers of the new corporation will be: President, Henry S. Shaw; treasurer, Rodman P. Snelling; general agent, Frank J. Hale; vice-president, James C. Howe; directory, Robert F. Herrick, chairman; Harcourt Amory, Wilmot R. Evans, Frank J. Hale, Seth M. Milliken, Charles E. Rogerson, Henry S. Shaw and Rodman P. Snelling.

Business men of New Britain and Ansonia, Conn., both important manufacturing centers, are projecting a barge canal from the Connecticut River to give them water rates for freight.

The Heald Machine Company, Worcester, Mass., manufacturer of grinding machines, has begun the erection of a building 30 x 40 ft., which will be devoted to the hardening and tempering department. The most modern equipment for the heat treatment of steel will be installed.

The Rockwood Sprinkler Company, Worcester, Mass., manufacturer of automatic sprinkler systems, has purchased a tract of land adjoining its works, the purpose being to provide for future extensions. The company has increased its equipment in a large way in the past year, being a continuous buyer of machinery.

The Blake & Johnson Company, Waterbury, Conn., has brought out a new slitter, designed with the primary object of changing cutters in minimum time, and for high efficiency in slitting steels.

The Worcester Gas Light Company, Worcester, Mass., has awarded the contract to the Riter-Conley Company, Pittsburgh, for a gas holder to cost $250,000 and containing 2500 tons of steel.

A dispatch from Naugatuck, Conn., announces the organization of the Eastern Malleable Iron Company, a Connecticut corporation of which Harris Whittemore, of Naugatuck, is the head. This, according to the announcement, is a consolidation of five works, including the Naugatuck Malleable Iron Company, the Bridgeport Malleable Iron Company, Bridgeport, Conn., the Vulcan Iron Works, New Britain, Conn., and plants in Wilmington, Del., and Troy, N. Y. The main offices will be at Naugatuck.

The Massachusetts legislature has appropriated $9,000,000 for the creation of docks and dry docks in Boston harbor, and the directors of the port have set apart $2,500,000 of the sum for the creation of a freight terminal which will be accessible not only to the Boston & Maine and New York, New Haven & Hartford systems, but to the Grand Trunk when the line now building across southern Massachusetts and Rhode Island to Providence is extended to Boston. The intention is to make the State's docks as complete as any in the country, with docking and dry docking facilities for the largest merchant ships.

The large plant of the White-Warner Company, Taunton, Mass., manufacturer of ranges and stoves, together with the works of the Union Stove Lining Company, were destroyed by fire October 17 with a loss of over $130,000 to the former corporation and $30,000 to the latter. The insurance is large. The White-Warner Company lost foundry, machine shop and storehouse. The works will without doubt be rebuilt.

The Lyon Mfg. Company, Fitchburg, Mass., has been incorporated with a capital stock of $50,000 to build textile machinery. Peter Ward is the president and Alfred P. Cate treasurer.

The Dunbar Bros. Company, Bristol, Conn., manufacturer of springs, will erect an addition to its hardening shop 40 x 40 ft., one story.

The Franklin Moore Company, Winsted, Conn., will build an erecting shop 40 x 90 ft., one story.

The American Graphophone Company, Bridgeport, Conn., will erect another addition 27 x 72 ft., two stories.

The Griffin Wheel Company is preparing to erect three additional buildings at its works, Chelsea, Mass., which will increase the capacity by 500 wheels per day.

The power house which the Newton Paper Company will erect at Holyoke, Mass., will be 50 x 100 ft. and will contain engine, condenser and boiler rooms.

Philadelphia

PHILADELPHIA, PA., October 22, 1912.

Trade in machinery and tools continues fair, but some builders of machine tools have noted a slight decline in the volume of new business. This is substantiated in a measure by reports received from merchants who state that, notwithstanding good inquiries, in cases more extensive than at any time this year, there is some hesitancy shown to close orders. Users of machinery are, in many instances, crowded with orders and unable to make deliveries for a long period ahead. Sales have been largely in single tools and small lots, although several moderate propositions for equipment are pending. Railroad buying continues of an irregular character. A very satisfactory export trade is being done in some lines of special tools, such as cold saw cutting off machinery and power equipment specialties. Second-hand machinery continues fairly active and a good demand for boilers and engines of medium capacity is noted. Makers of steel castings are extremely busy, while gray iron foundries are increasing in activity.

The Diamond Textile Machine Company, 1436 North Ninth street, has had plans prepared for an addition 50 x 223 ft., part one and part two stories, for a machine shop and office. The company will be in the market for a number of machine tools, including several lathes.

Local builders are figuring on the construction of a brick ice plant, 95 x 297 ft., two stories, to be erected for the American Ice Company in Washington, D. C. Plans are by Mortensen & Co., 114 East Twenty-eighth street, New York City. The owners are receiving bids for the construction of the building.

The William Steele & Sons Company has begun work on a four-story factory and one-story boiler and engine house for Harry C. Eberle & Co., at Clearfield and A streets. It has also begun work on a five-story factory building, 47 x 138 ft., for the George W. Blabon Company, Nicetown, Philadelphia.

The American Pulley Company has completed the building of the foundations for its new warehouse and shipping room, and will commence the erection of the building at an early date. The company's domestic demand has increased and there has been a steady improvement in its foreign business. Large shipments of pulleys have been made to Australia, France and Holland. Heavy shipments to the Pacific coast are also reported.

The Collings Carriage Company, Front and Market streets, Camden, N. J., is receiving bids for the erection of a factory, 90 x 100 ft., three stories, to be erected at Front and Federal streets.

The Eynon-Evans Mfg. Company is installing core room equipment on the third floor of its new brass foundry. The present equipment will be planned for the output of 12 employees. The installation of sand blast equipment is also being considered. Its various departments are all extremely busy and the foundry is making a larger output than at any previous time.

The Lea Equipment Company is operating its plant at full capacity and has recently closed a number of very good contracts, including a large sump pump for J. A. Holmes, of New York; a 1500 gal. per min. fire pump for shipment to De Kalb, Ill.; a 3000 gal. per min., and a 1500 gal. per min. pump have been ordered by the Edward Malley Company, San Francisco, Cal. Two turbine pumps are to be furnished Swift & Co. at Chicago, while four large pumps are building for Macon, Ga., parties. The company's export business included six Lea Simplex cold saw cutting off machines to Japan, six saws of similar type to Germany, one to Russia, and one to Holland.

The Earle Gear & Machine Company has entered a contract for the operating mechanism for a Strauss bascule bridge over the Sabine-Neches Canal; the total weight of this equipment will be 185,000 lb. It also has

a contract for lock gate operating mechanism for two pairs of locks for the New York State Barge Canal. It is also completing the operating mechanism for the Staten Island transfer bridge for the Baltimore & Ohio Railroad, which will operate the heaviest apron type bridge in this country. The Earle Gear & Machine Company is operating its plant on full double turn and has tentative plans under consideration for extensions which will double its capacity.

The Lilge Gas Rotary Engine Company, 3652 Warder street, N. W., Washington, D. C., recently incorporated with $250,000 capital stock, has had plans prepared for the erection of a fireproof building estimated to cost about $200,000. The building will be equipped with machinery for the manufacture of gas rotary engines. Louis E. Lilge is president of the company and George P. Lilge, secretary-treasurer.

The Ford Motor Company, Detroit, has acquired a building at the corner of Sixteenth street and Washington avenue, Philadelphia, which permits of switching of freight cars in its own yard. It is planned to assemble the cars, which are shipped from its factory in knock down condition, at this plant and thereby greatly facilitate delivery in this district.

The Weatherly Iron & Steel Company is stated to have purchased the shops of the Lehigh Valley Railroad Company, Weatherly, Pa., and will engage in the manufacture of iron and steel castings. E. F. Warner is president; F. A. Kunkle, vice-president; J. E. Rosenstock, secretary, and Percy E. Faust, treasurer.

Chicago

Chicago, Ill., October 22, 1912.

The machine tool business here in the past week dragged somewhat, and with the exception of a few prominent purchases the miscellaneous buying was light. The extensions of the Harley-Davidson plant for the manufacture of motor cycles at Milwaukee brought out orders for machines amounting to several thousand dollars; a new corporation, also making motor cycles in that city, bought tools valued at close to $3,000; the Cutler-Hammer Mfg. Company took several machines and a crane and foundry supply manufacturer in a nearby suburb purchased drills and other tools. The placing of orders for the large total of railroad equipment upon which quotations have been in for some time is still held in abeyance, while at the same time the requirements of the railroads for new shops and roundhouses steadily increase. Other industrial building of new shops and additional capacity continues to assume important proportions and the prospect of miscellaneous sales for general machine shop and manufacturing purposes is very promising.

The city of Chicago is buying a 28-in. turret lathe for its South Ashland avenue shops.

The Chicago, Peoria & St. Louis Railway, J. P. Ramsey, manager, St. Louis, has placed a contract for car and machine shops at Springfield, Ill., upon which an expenditure of $50,000 is contemplated.

The F. J. Lewis Mfg. Company, Chicago, whose plant was recently damaged by fire to the extent of $100,000, will rebuild at once.

L. E. McGann, commissioner of public works, 406 City Hall, Chicago, will receive proposals for furnishing and delivering a 28-in. turret lathe and tools, to be erected on a foundation prepared by the city.

Raeder & Wood, engineers, 20 West Jackson Boulevard, Chicago, have awarded the contract to Jensen & Steenhill for the erection of a factory building 240 x 80 x 120 ft. for the Impact Pulverizer Company.

The Anderson Engine Company, 160 North Fifth avenue, Chicago, has awarded the contract for its new factory building at Argo, Ill., to cost $15,000. The building will be 75 x 156 ft., one story. The architect is Thomas Wing, 115 South Dearborn street, Chicago.

The Whitacre Fireproofing Company, Waynesburg, Ohio, has purchased a large tract at Chicago Heights, Ill., and will erect a plant to which the business will be transferred as soon as possible.

The Columbia Tool Steel Company, Chicago Heights, Ill., is about to begin the erection of an addition to its plant, the building to be completed in the spring.

The Aurora Automatic Machinery Company, Aurora, Ill., whose improvements have been previously mentioned, has awarded the contract for the new buildings which will cost about $80,000 and will include a machine shop for which new equipment will be purchased.

The Rockford Milling Machine Company, Rockford, Ill., has purchased a site and is about to build a one-story factory providing about 40,000 sq. ft. of floor area and to cost $25,000.

The Chicago, Milwaukee & St. Paul Railroad is preparing plans for the erection of a new terminal at Bensonville, Ill., which will include a roundhouse, power house, storehouse, and machinery and blacksmith shop.

G. W. Schueppert, former sales manager of the Oshkosh Logging Tool Company, and H. B. Richmond, have purchased the plant and business of the Merrill Iron Works, Merrill, Wis. Under the new ownership, improvements will be made in the foundry and machine shop, including the installation of a large lathe, drill press, iron planer, and other machinery. The new company retains the old title Merrill Iron Works.

The Invincible Mfg. Company, Monroe, Wis., will shortly remove its plant to Rockford, Ill., where better facilities are provided for the expansion and growth of its business. The company manufactures steel fixtures.

The Federal Rubber Mfg. Company, Milwaukee, Wis., will expend about $500,000 for improvements to its plant, including which will be a new power plant aggregating 3500 hp.

The Wisconsin Foundry & Machine Company, Milwaukee, Wis., is planning the erection of a new machine shop building to cost $5000.

The Parker-Hart Machine Company, LaCrosse, Wis., has been incorporated with a capital stock of $5000 by Harriet E. Parker, Joseph F. Hirt, and others, to do a general machine manufacturing business.

The Twentieth Century Brass Company, St. Peter, Minn., contemplates the erection of a plant in the near future.

The E. G. Staude Mfg. Company, Minneapolis, Minn., has taken out a permit for the erection of a brick factory 67 x 230 ft., two stories, on University avenue, to cost $35,000.

The Jackson Mfg. Company, Rockford, Ill., has been incorporated with $25,000 capital stock, for the manufacture of laundry and similar machinery. The incorporators are Charles E. and Roy C. Jackson and Arthur H. King.

The National Cycle Accessory Company, Aurora, Ill., has been incorporated by A. J. Jeffery, E. E. Ruth, A. G. Gustafson for the manufacture of automobile and bicycle accessories on a large scale.

Cleveland

Cleveland, Ohio, October 22, 1912.

Local machinery dealers report a good volume of single tool orders from widely scattered sources. The demand is good both for small standard tools and for heavy machinery. There is considerable demand for heavy automatic turret machinery. Structural steel fabricators are buying quite freely of such machinery as is used in their plants. Cleveland dealers look for considerable buying from the railroads during the next few months. Lists are expected shortly from the Big Four and Lake Shore & Michigan Southern Railroads. A good sized list is expected from the latter for machinery for its various shops. In addition this road will probably have a large list out for equipment for its Elkhart, Ind., shops, the erection of which has been held up for two years. The demand for second-hand machinery is fairly active.

In the foundry trade conditions are very satisfactory. There is a heavy demand for steel castings from machinery builders and other users. Local gray iron foundries are well filled with work and are taking on contracts for considerable work for next year's delivery. Many consumers are eager to cover with contracts. Because of the advance in prices of pig iron and coke foundries have made considerable advance in the price of castings.

The scarcity of common labor in Cleveland has become quite serious and contractors who have work to finish before winter sets in are paying exorbitant wages for men. Some relief is expected in the situation as soon as outdoor work falls off, as more men will be available then for common labor in manufacturing plants.

The Eller Mfg. Company, maker of sheet metal goods, Canton, Ohio, has secured a new site at Camden avenue and the Pennsylvania Railroad on which it will begin the erection of a new plant early next spring. The building of the new plant was made necessary by the large growth of the company's business. The new plant will be 300 x 280 ft. and one story. All

the machinery will be driven throughout by electricity.

The Rauch & Lang Carriage Company, Cleveland, builder of electric automobiles, will erect a large garage at Euclid avenue and East 100th street.

The Seneca Chain Company, Kent, Ohio, has decreased its capital stock from $300,000 to $150,000.

The Kilmer Spring Support Company, Cleveland, has been incorporated with a capital stock of $30,000 to manufacture a spring lock to be used in connection with springs. M. D. Kilmer, A. B. Lambert and others are the incorporators.

The Acme Foundry Company, Cleveland, will enlarge its plant by the erection of an addition 75 x 105 ft. This will be used for shipping and warehouse purposes and the space formerly occupied by these departments will be used in enlarging the size of the foundry floor. No new foundry equipment will be required.

The Automatic Belt Shifting Company, Cleveland, has been organized with a capital stock of $100,000 to manufacture automatic belt shifters. The incorporators are Ernest F. Baur, L. E. Kingsburg, John C. Baur and others.

A company is being organized in Mt. Gilead, Ohio, to manufacture a new universal joint, the invention of A. H. Fetzer. The erection of a plant is contemplated.

The plant and machinery of the Broughton Bolt Company, Elyria, Ohio, is being offered for sale by F. B. Wadham, receiver. The plant consists of a new building 50 x 206 ft., a power plant and a large amount of bolt and nut machinery.

Proposals for two electrically driven pumps for the Cleveland City Infirmary Farm will be received by C. W. Stage, director of public safety, Cleveland, October 31.

The Elgin Brass Company, Cleveland, of which John O. Mangan is manager, will shortly double the capacity of its plant. The company reports that it is crowded with orders and its present capacity is inadequate.

Cincinnati

CINCINNATI, OHIO, October 22, 1912.

In spite of the fact that many medium sized plants in the Central West are installing gas engines for motive power, there is an excellent demand for boilers of all sizes. Boiler makers are also busy with large tank construction, and report the labor shortage as being the only difficulty preventing full operation of their plants.

Cincinnati should make a good market for smoke prevention devices, as the fight for the elimination of the smoke nuisance is well under way, and with very few exceptions, local manufacturers are working in conjunction with City Smoke Inspector A. G. Hall, to solve this vexing problem.

With quite a number of machine tool builders, the past week was not so prolific of orders, although it is stated that the automobile trade has been doing some heavy and quiet buying of tools. One Detroit firm in particular is known to have placed orders, lately, in different parts of the country, for over $200,000 worth of machine tools. All local foundries are busy, and there is also considerable improvement noted by second-hand machinery dealers.

The Acme Machine Tool Company, Cincinnati, has increased its capital stock from $100,000 to $150,000, and is buying a quantity of machine tools to be installed in its plant on Buck street. Its output will be increased at an early date, but no building additions are planned just now.

The Ideal Wheel Company, Cincinnati, 1919 Race street, recently incorporated with $1,000,000 capital stock, has purchased the former plant of the Seufferle Cooperage Company, at Winton place, and will soon move its factory to the new quarters. The company manufactures a patented steel automobile wheel, and will require machine tools, as well as other special equipment to fit up its new plant.

The Baltimore & Ohio Southwestern Railroad Company will soon commence work on a switch that will extend to over 12 machine tool and manufacturing plants in the Camp Washington district, Cincinnati. It is rumored that, with switching facilities furnished, two large factories in that district, now idle, will be started up, if labor can be obtained for operating them.

The Queen City Engineering & Machine Company, Cincinnati, has been incorporated with $10,000 capital stock, and will make a specialty of repairing and selling second-hand machinery. A shop has been opened at 848 West Sixth street. The incorporators are Rudolph Felhauer, Edmund Felhauer, C. C. Penny, H. J. Brumlage and C. J. Brumlage.

The Gage Company, Dayton, Ohio, is a new incorporation with $25,000 capital stock, to manufacture power plant specialties. Joseph J. Gage is named as the principal incorporator.

The Dayton Brass Castings Company, Dayton, Ohio, has been incorporated with $15,000 capital stock, by James D. Platt, Jr., and others.

The Sun Mfg. Company, Columbus, Ohio, manufacturer of showcases and hardware specialties, is making a large addition to its plant, for which some special equipment will be required.

The People's Pure Ice & Refrigerating Company, Hamilton, Ohio, has been incorporated with $150,000 capital stock, to build a large ice and cold storage plant at that point.

The Norwood Sash & Door Mfg. Company, Norwood, Ohio, has let contract for a four-story, reinforced concrete addition to its plant. Very little machinery equipment will be required as the proposed addition is intended mainly for warehouse purposes.

The Globe Automatic Sprinkler Company, Cincinnati, has awarded contract for a brick storage warehouse addition to its plant in Reading road.

The Ahrens Iron Works Company, Cincinnati, was the successful bidder for the structural and ornamental iron work for the proposed 12-story Hotel Gibson.

The Columbus Iron & Steel Company, Columbus, Ohio, has had plans prepared for a one-story shop and office addition to its plant.

The Wadsworth Watch Case Company, Dayton, Ky., has had plans prepared for an additional building that will be used by its plating department.

Detroit

DETROIT, MICH., October 22, 1912.

A satisfactory volume of business was done the past week by local machinery dealers and the general feeling of the trade is optimistic. The bulk of purchases reported were for small groups of tools and lists of importance seem to be lacking in this territory. At the same time the buying covers a wide range of requirements and indicates a healthy condition among the manufacturers. Woodworking equipment is more active. The second-hand machinery trade is feeling a better demand, especially from up-state sources. Some lines of special machinery are showing a brisk movement, notably telephone and electrical equipment. A steady run of business in boilers and engines is noticed. The foundry situation is unchanged. Building circles are dull.

The M. G. M. Mfg. Company, Detroit, has been incorporated with a capital stock of $200,000. The company will manufacture special brass goods and air compressors. H. R. Haberkorn is president; Douglas McCracken, treasurer and general manager, and C. A. Milne, secretary and consulting engineer. A factory is being erected at 1523-31 Fort street, West, comprising a machine shop and foundry, 100 x 218 ft., of brick and steel construction.

The Studebaker Corporation, Detroit, automobile manufacturer, has awarded a contract for a brick and steel addition to its plant on Clark avenue, to be used as a forge building.

The Keny-Rusch Company, Detroit, has been organized to manufacture all kinds of concrete products. A plant has been secured at Mitchell avenue and is being equipped.

The Tyro Mfg. Company, Detroit, has been organized to manufacture and deal in automobile and vehicle accessories, with a capital stock of $5000. The incorporators are Roy I. Wellington, William C. Stuart and F. J. B. Gerald.

The Jeffrey-DeWitt Company, Detroit, manufacturer of spark plugs, has acquired an additional factory which it will operate in connection with its present plant. The new building will house the assembly and shipping departments.

The plant and machinery of the defunct American Electric Fuse Company, Muskegon, Mich., has been sold at receiver's sale to the Superior Seating Company, of Muskegon, for $30,000. It is stated that the purchaser intends to occupy the plant.

G. A. Webber, Jackson, Mich., is interested in the establishment of a $65,000 company at Grand Rapids, Mich., for the manufacture of paper milk bottles.

The McGreevy Steel Company, Iron River, Mich., has been organized with $500,000 capital stock to carry on a general iron mining business. The company will operate several existing mines and develop numerous

prospects. A considerable amount of mining machinery will be immediately required. J. C. McGreevy, Duluth, Minn., is president.

Van Auken & Jacobs, Pontiac, Mich., are completing plans for the organization of a company with a capital stock of $10,000, to manufacture electric delivery cars.

The Plank Flexible Shaft Machine Company, Grand Rapids, Mich., has been organized with a capital stock of $50,000. J. R. Plank is president.

A planing mill will be established at Mt. Pleasant, Mich., by Loncor & Ferris.

Leroy Stebbins and F. E. Moore, Lakeview, Mich., have completed arrangements for the establishment of a chair factory. Some equipment will be required.

The D. F. Poyer Company, Menominee, Mich., has been incorporated with $75,000 capital stock. The new company will engage in the manufacture of motor trucks.

The Parker Motor Company, Detroit, has been organized to manufacture rotary valve motors. The new company, of which Victor C. Parker is the head, has secured temporary quarters at 660 Grand River avenue.

The Aluminum Products Company, Detroit, has been incorporated with $15,000 capital stock, to manufacture a line of aluminum articles. Joseph Sillman is the principal stockholder.

The Paige Auto-hoist Company, has purchased a site at Grand Rapids, Mich., on which a factory will be erected. The company will manufacture a device for lifting the weight of an automobile from its tires while not in use.

The W. F. Stewart Company, Flint, Mich, states that the plant which it is erecting will be used for the manufacture of metal automobile bodies for pleasure cars and is designed to produce 100 complete bodies per day. The company is interested in the purchase of metal automobile body making machinery.

Indianapolis

INDIANAPOLIS, IND., October 22, 1912.

The H. J. Martin Forging Company, Indianapolis, previously mentioned, has taken out a permit for the erection of a factory at 510 South Harding street.

The Ames Shovel Works, Anderson, Ind., is preparing for an addition to its plant and for the installation of electric power.

Birch & Birch, Crawfordsville, Ind., are receiving bids through W. F. Sharpe, architect, 116 North Green street, on their new machine shop addition, one story, 60 x 75 ft.

At Kendallville, Ind., an electric light plant is to be installed for which $30,000 worth of machinery is to be provided. A new structure is to be erected for the plant and bids will be received in the near future.

The Glazier Mfg. Company, Indianapolis, has been incorporated with $30,000 capital stock, to manufacture nozzles and other fire-fighting appliances. The directors are P. F. Glazier, F. L. Meier and H. R. Victor.

The Western Electrical Testing Company, Indianapolis, has been incorporated with $25,000 capital stock, to manufacture magnetos and electrical ignition apparatus testers. The directors are C. Wieland, A. A. Borwy and F. C. Starky.

The Remy Electric Company, Anderson, Ind., manufacturer of magnetos, has increased its stock from $1,000,000 to $1,500,000.

The M. Rumely Company, Laporte, Ind., has purchased the Northwest Thresher Company, Stillwater, Minn., manufacturer of gasoline engines. C. P. Holton of Richmond, Ind., has been elected secretary of the Minnesota company, to succeed H. S. Stratton. The plant will be enlarged.

The Electric Time & Mfg. Company, West Lafayette, Ind., has been incorporated with $10,000 capital stock, to manufacture electrical and mechanical devices. The directors are A. E. Bradbury, C. R. Moore and H. W. Asire.

The Vincennes Novelty Mfg. Company, Vincennes, Ind., has been incorporated with $10,000 capital stock to manufacture novelties. The directors are F. C. Morgan, J. W. Neding and W. Duesterburg.

The American Sanitary Lock Company, Indianapolis, has been incorporated with $10,000 capital stock to manufacture locks. The directors are Leo Kahn, Indianapolis; E. H. Campbell, Springfield, Ky., and Jackiel W. Joseph, Indianapolis.

The Greenfield Wood Turning Company, Greenfield, Ind., has been incorporated with $10,000 capital stock to manufacture handles, novelties, etc. The directors are H. M. Campbell, P. G. Cook and J. D. Wetz.

The Rochester Garage & Machine Company, Rochester, Ind., has been incorporated with $15,000 capital stock, to do a machine and auto repair business. The directors are E. R. Creamer, O. C. Davisson and J. O. Gemin.

St. Louis

ST. LOUIS, MO., October 21, 1912.

The machine tool market here continues to maintain a very satisfactory run of business and the aggregate is holding up well in spite of some small signs of nervousness as the election date approaches. There seems no real disposition to slacken on account of the political situation, but in some respects there are evidences of a desire to know just what is going to happen. In general lines the demand is good and the request for second-hand machinery is excellent, all things considered. Collections are good.

The Continental Piano Mfg. Company, St. Louis, with $200,000 capital stock, has been incorporated by O. C. Nelson, M. J. Gardner, William Heine, D. E. Noack and others, and will equip a plant at once for the manufacture of high-grade musical instruments.

The Ever-Tight Ring Company, St. Louis, with $21,000 capital stock, has been incorporated by A. J. Northcraft, Edward B. Campbell and Walter Hefferkamp, to equip a plant for the manufacture of piston rings.

The Porto Rico Mining Company, Kansas City, Mo., with $25,000 capital stock, has been organized by E. S. Bigelow, D. I. Parson, B. R. Clarke, J. E. McCoy and G. A. Barnett, to equip and operate mining property owned by them.

The Peroxide Specialty Company, St. Louis, Mo., with $50,000 capital stock, has been incorporated by J. B. Brufiner, Fred T. Barrett, and others for the equipment of a plant for the manufacture of chemical specialties.

The Western Power & Light Company, incorporated by Paul D. Cable and others of St. Louis, has sought a franchise for its operations in St. Louis County and adjoining counties. It plans to begin the work of construction of plant within 30 days. G. E. Gollerman, F. R. Mott and others are interested.

The Halsey Automobile Company, St. Louis, has plans for the construction of a new building which it will equip as a repair shop and garage of considerable size.

The Public Service Company, Mattoon, Ill., has bought the electric light and power plant of that city and will remodel and improve its equipment.

The Sparta Plow Works has been incorporated with $30,000 capital stock by A. S. Crothers, W. H. Pinkerton, M. O. Lundholm and others at Sparta, Ill., and will operate a plant at that point.

The Colonial Cabinet Company, St. Louis, Mo., has increased its capital stock from $10,000 to $25,000 for the purpose of increasing its manufacturing equipment.

B. H. Kroger, Cincinnati, Ohio, has bought a site in St. Louis at a cost of $125,000, upon which to erect and equip a canning and packing plant to supply a chain of 150 grocery and other stores.

Plans have been completed by the Heil Packing Company, St. Louis, Mo., to build an addition to its plant with equipment to cost about $6,000.

The Stamps Gin Company, Stamps, Ark., has been incorporated with $10,000 capital stock. The company plans to construct and equip at once a cotton gin. The incorporators are J. A. Drake, W. B. Hinton and A. P. Beasley.

C. B. Steadman, Selmer, Tenn., has completed plans for the construction of an electric light plant and cotton gin in connection therewith. F. F. Hendrix and Albert Gillespie are associated with him.

The Leslie Light & Power Company, Leslie, Ark., has been incorporated with $50,000 capital stock by J. C. Miller, E. W. Montrizel, W. C. and H. L. Leonard and Edw. Lemoys. It will remodel a small existing plant and install equipment for the production of electrical power.

The Mississippi Valley Cold Storage Company, St. Louis, has plans for the construction of additional warehouses and the installation of some new equipment.

The Howell Bros. Lumber Company, whose mill at Junction City, Ark., was recently burned, with a loss of about $15,000 on machinery, announces that it will rebuild and re-equip it at once.

E. E. Richards, A. G. Wachsen and B. R. Moses, Grabow, La., have organized the Anacoco Lumber Company, with $100,000 capital stock, and will equip a plant at once to cut up timber on lands acquired by them.

Walter McCain, John Chaumont and W. B. Williams, at Lake Charles, La., have completed the formation of the Bayou Lumber Company, with $25,000 capital stock, to develop timber property owned by them near Bayou Blue in Calcasieu Parish, Louisiana.

The Norman Lumber Company, Louisville, Ky., have bought 7000 acres of timber land in Richland Parish, La., which it will equip with mills at once and develop.

A sawmill to cost about $15,000, will be built at Butler, Miss., by T. J. Sproggins & Son, of Fenwick, Miss., to develop timber property.

The American Can Company, New Orleans, has had plans drawn by Favrot & Livaudais of New Orleans, for a $50,000 addition to its plant, the cost to include mechanical equipment.

An electrical plant is to be installed at Joplin, Mo., by the F. R. Cornett Mining Company, to replace a steam plant. The expenditure will be about $5,000.

The Midland Valley Railroad's roundhouse and repair shop at Pawhuska, Okla., recently destroyed by fire, will be rebuilt and re-equipped, the machinery, etc., to cost about $6,500.

The St. Louis Vitrolite Company, with offices in the Century Building, St. Louis, is preparing to equip a plant with marble cutting and polishing machinery, etc.

The Fannin & McCullough Sheet Mill Company, recently incorporated and afterwards acquiring a plant at Ashland, Ky., is reported to be in the market for considerable additional equipment for the purpose of increasing the capacity of the works.

B. M. Van Orman and others of Sapulpa, Okla., have completed arrangements with George F. Collins, of Coffeyville, Kan., for the construction and equipment at Sapulpa of a large glass plant.

Waterworks to cost about $40,000, will be built by the city of Corbin, Ky., under a bond issue recently voted, the mayor being in charge of the matter.

The Imperial Mining Company, Webb City, Mo., has completed plans for the construction and equipment of a concentrating plant and other machinery for the development of ore property owned by Frank Weeks, S. H. Velie and Thomas Walker. The company has a capital stock of $25,000.

The Webster Oil Company, Oklahoma City, Okla., has been incorporated with $25,000 capital stock, by W. A. Ledbetter, E. I. Newblock and C. J. Webster to equip and develop property owned by them.

An electrical plant to cost about $5,000 will be installed by the Mary E. Lead & Zinc Company, at Joplin, Mo., to replace the steam plant which has heretofore been utilized.

M. W. Holloway, E. D. Ballard and H. J. Swartz have plans for the installation of $15,000 lead and zinc mill, to develop property owned by the Greater New York Mining & Development Company recently incorporated by them at Miami, Okla.

The Century Electric Company, St. Louis, has purchased a site on which a seven-story fireproof building is to be erected, at a cost of about $150,000.

The Southwest Blau Gas Company, Kansas City, Mo., will build a two-story factory in that city at a cost of $40,000.

The Central South

LOUISVILLE, KY., October 22, 1912.

This is proving to be one of the best months of the year for boiler manufacturers. Full time operations are the rule. Inquiries have become more numerous, orders have been placed in number and the outlook is really excellent. Complaints as to price-cutting, which were rather prevalent while business was quiet, are seldom heard. In addition to boilers, other power equipment is needed, and while special machinery is also in demand, this is the principal line just at present.

Edinger & Co., Louisville, are adding to the equipment of their feed mill. Some of the special machinery has already been bought.

The Louisville Point Lumber Company, Louisville, is considering the purchase of a large tract of timberland in the South and the erection of a sawmill of considerable size. The exact location of the mill has not been decided on. Edward S. Shippen is president.

The Farmers' Union Mills, Versailles, Ky., will purchase a 100-hp. boiler and a 75-hp. engine for installation in a new 100-barrel flour mill which is being erected in Versailles. The contract for the milling machinery has been let.

A. M. Blowers, Pineville, Ky., is to establish a lime plant at Kendrick, Fla. A rotary hydrating machine will be among the equipment installed.

Charles Taylor, Cincinnati, O., is considering plans for the establishment of a fire-brick plant at Enterprise, Ky.

The Paducah Cooperage Company, Paducah, Ky., is planning the erection of a large mill for the manufacture of tight barrel staves at Charleston, Miss., where it recently purchased 2700 acres of timberland.

Clyde Gaines, Irvine, Ky., has purchased equipment for a small electric light plant, which will serve part of the business houses of the town. A larger plant for the maintenance of a street lighting system is contemplated.

The Danville Light & Power Company, Danville, Ky., control of which recently passed to Chicago interests, is to make extensions to Perryville and Junction City, nearby communities. The plant will be enlarged to take care of the increased load.

The Dixie Canning & Preserving Company, Louisville, is being organized with a capital stock of $50,000 and will erect a meat-preserving plant. David Etley is president, John F. Hagan vice-president, and Alfred Rose secretary and treasurer.

Butler Carrier, Richmond, Ky., is erecting a large and modern dairy plant, and will install refrigerating equipment and other special apparatus.

Abner Hubbard, Greensburg, Ky., is completing the construction of a tobacco warehouse. Equipment for prizing and handling tobacco will be needed.

George C. Baird, Nashville, Tenn., has secured leases on 1000 acres of lands near Owensboro, Ky., and will shortly purchase equipment for their development.

The Kendall Lumber Company, Philadelphia, Pa., will erect a large band-mill in West Virginia, just over the Kentucky line, and will develop timber holdings there. The company has 20,000 acres of land.

The South Paris China Company, Paris, Tenn., has been organized with $25,000 capital stock to manufacture chinaware. Clay lands have been purchased and work will be begun at once in the direction of erecting a plant.

The Middle Tennessee Gin Company, Nashville, Tenn., will erect a plant at Martin, Tenn. Power machinery will be needed.

W. M. Mitchell, for ten years manager of the Kentucky & Indiana Terminal Railroad Company, Louisville, has resigned his position to devote his attention to the sale of a number of railroad devices. The contract for their manufacture has been let to the Marion Malleable Iron Works, Marion, Ind.

Brooksville, Miss., will receive bids on complete equipment for an electric light plant until November 5. The machinery includes a 60-hp. oil engine, air compressor and pump. T. S. Gay, clerk of the council, has specifications.

The Louisville Light & Power Company, Louisville, Miss., is in the market for a three-phase generator, 60 to 80 kw., with switchboard.

The Oaks Mfg. Company, Newbern, N. C., is equipping a foundry for the manufacture of castings for use in its implement factory.

The Salem Iron Works, Winston-Salem, N. C., is erecting a new power plant and will install equipment.

Birmingham

BIRMINGHAM, ALA., October 21, 1912.

Business in pumps, boilers and other machinery is fair and fully up to the September record—perhaps better. There are few idle factories and many of them are taking on additional equipment. While the sawmills are suffering from the scarcity of cars, they are inclined to do as much repair work as possible. There is a good inquiry for boilers, with a smaller demand for pumps. Altogether business is satisfactory all around, with the same good outlook for the future of an indefinite period.

M. H. Maury, manager of the Lynchburg Pipe & Foundry Company, which is erecting a pipe works at Anniston, Ala., announces that drawings have been completed and sent out to steel fabricators for bids. The plant will be extensive.

The Light, Heat & Power Incorporation, Boston, Mass., has purchased the ice plant at New Smyrna, Fla., and will improve it. E. J. Gunn, Daytona, Fla., represents the company.

The city of Lavonia, Ga., has granted a franchise to the J. B. McCrary Company, Atlanta, Ga., to establish an electric lighting system. The current to be brought 11 miles.

The Anderson Lumber Company has applied to the city of Waycross, Ga., for a franchise to establish a

lighting and power plant to furnish city and private consumers.

Machinery has been bought for a $35,000 plant for the manufacture of metal roofing and other metal building materials at Americus, Ga. The company will be known as the Southern Art Metal Company. J. W. Hightower, L. W. Rose and others interested.

The Acme Phosphate Company, Jacksonville, Fla., has been chartered with a capital stock of $250,000. William A. McGuire, William E. Scott and others, all of Chicago, are the incorporators.

The American Hardrock Phosphate Company, Tampa, Fla., has been chartered with a paid-in capital stock of $300,000. The company has phosphate property in Citrus and Hernando counties and will establish mining plants. Charles F. Robbins, of New York, is president; W. M. Brooks, of Tampa, Fla., secretary and general manager.

The Planters' Cotton Oil Company, incorporated with a capital stock of $70,000, by John D. Little and John Hill, of Atlanta, and H. H. Tift, W. W. Banks and others, of Tifton, Ga., will install a three-press mill with a capacity of 9000 tons of seed.

A. J. Gilden, Maxeys, Ga., James M. Smith, Smithsonia, Ga., Hamilton McWhorter, Jr., Lexington, Ga., and others have purchased the mill property of the Greene County Oil Company. The new company has $50,000 capital stock and will increase the capacity of the plant at Union Point, Ga.

The People's Fertilizer & Grain Company, will establish fertilizer-making plant at Bay Minette, Ala. W. M. Stuart is president and E. A. Huggins secretary and treasurer.

The City Milling & Trading Company, Tallahassee, Fla., has been organized by W. C. Tully and H. I. Gregory to manufacture meal and feed stuffs.

The Pulzer Mfg. Company, Montgomery, Ala., has been organized with authorized capital stock of $50,000, to manufacture heating systems and ventilating plants. R. Hugger is president and C. F. Galliher is secretary and general manager.

A. B. Hull and C. C. Martin, of Mulberry, Fla., will establish phosphate plant on a 25-acre tract at Fort Meade, Fla.

The Reid Lumber Company, Birmingham, has bought the Lowery & Clancey sawmill near Selma, Ala., and will move the plant to Tyler Station. It is reported it will equip the plant with modern machinery.

The Bagwell & Grower Mfg. Company, of Gainesville, Ga., will enlarge its vehicle plant.

The Manchester Sawmills Company, Manchester, Ala., has been chartered with a capital stock of $100,000. Frederick J. Jeffris is interested.

Camilla, Ga., will use $10,000 of bonds recently voted to extend its water and lighting systems.

An election will be held at Sarosata, Fla., on an issuance of $15,000 of bonds for the building of a water works. Harry L. Higel is mayor.

Texas

AUSTIN, TEX., October 19, 1912.

The machinery trade is still in a most satisfactory condition, the demand for various lines of heavy machinery as well as small tools being much larger, it is stated by dealers, than it was at this time a year ago. In Arizona and New Mexico trade conditions are also very satisfactory. The situation in Mexico shows no improvement and many projects in that country which involve the purchase of large quantities of machinery are being held in abeyance pending the restoration of tranquillity, which at this time seems not to be in immediate prospect.

It is announced by the Gulf, Colorado & Santa Fé Railroad Company, that it has adopted plans and specifications for its proposed extensive freight terminals at Brownwood. The estimated cost of the improvements is $520,000, made up as follows: Division freight yards, $251,000; repair yards, $170,000; 12-stall engine house, $45,000; standard 85-ft. turn table, $11,000; machine shop, $10,000; car shed, $8,500; power house, $8,000; sand house, $5,500; roundhouse, foreman's office and supply house, $2,500; engine supply house, $1,300; concrete subways in the city, $100,000.

The Conroe Gin, Light & Ice Company, Conroe, has been organized with a capital stock of $20,000. The incorporators are J. Wahrenberger, C. P. McDade, Mrs. M. E. Uzzell and others.

The Sinton Ice & Light Company will make improvements to its plant at Sinton, and also enlarge its water supply.

The Bay City Brick & Tile Company, Bay City, has been organized with a capital stock of $7,500. The incorporators are B. E. Norvell, J. E. Kinnesell and J. W. Gaines.

The Santa Fé Tie & Lumber Preserving Company will install a timber creosoting plant at Somerville. W. Maxson is interested.

The construction of a municipal sewer system at Nocono is in contemplation.

C. T. Herring, of Amarillo, will install a number of pumping plants on shallow wells upon a track of 30,000 acres of land which he owns in Castro County, for the purpose of placing the tract under irrigation.

The Texas Land & Development Company has begun boring of wells upon the 60,000-acre tract of land near Plainview, that is to be brought into a high state of agricultural development. A pump will be installed upon each well and the water used to irrigate different subdivisions.

S. N. Qualls will install a canning factory at Palestine.

J. T. Cameron will rebuild his machine shops at Humble, which were recently destroyed by fire.

The City Council of Corpus Christi has under consideration the matter of developing a new and larger municipal water supply. Alexander Potter, consulting and construction engineer of New York City, has submitted a proposition to undertake this work.

The American Smelting & Refining Company contemplates installing a large electric power plant at Hayden, Ariz., which will be used as an auxiliary source of power in connection with that which the company is now receiving from the plant of the Ray Consolidated Mining Company.

George Utter will enlarge the zinc concentrating plant at his mines in the Pinos Altos district, in New Mexico.

The Mogollon Gold & Copper Company will install an electric hoist at its mine near Mogollon, N. M.

The Atchison, Topeka & Santa Fé Railroad is having plans and specifications prepared for the construction of new shops at Albuquerque, N. M., at an estimated cost of $1,600,000.

The Casa Grande Valley Water Users' Association, which has a capital stock of $5,000,000, is preparing to construct a system of irrigation in the valley of the Gila River near San Carlos, Ariz., that will bring about the reclamation of about 100,000 acres of land. It is proposed by the company to construct a large dam and water storage reservoir on the Gila River at San Carlos and a concrete diversion dam on the same stream at the upper end of the valley. Preparations are being made to install a number of pumping plants upon shallow wells in the valley.

The Pacific Coast

SAN FRANCISCO, CAL., October 15, 1912.

Merchants report a very satisfactory volume of small machine tool business, and new inquiries increasing both in volume and individual importance, though the larger buyers are rather slow in placing orders. The Western Pacific Railroad has not yet closed any contracts on its list, and may hold off a week or two longer. Some other railroad business of an important nature is expected to develop early next year, but nothing of a definite nature can be learned of it at present. Several California shops are now rushed with work, and are preparing to move to locations offering opportunities for expansion, at the same time putting in more or less machinery. Some of the largest orders from such sources, however, are being placed direct in the East.

Orders are beginning to come out for hydroelectric equipment of the heaviest type, and some very large contracts are expected within the next few months, providing for the principal development now under way. At least one new project is also taking shape, the announcement being made that the Oro Electric Corporation will soon start work on its Yellow Creek plant on the Feather River, where about 60,000-hp. will be developed, water being available with a 2000-ft. drop. Activity in general lines of machinery is well maintained, with little change in the character of the business.

The Llewellyn Iron Works, Los Angeles, has completed arrangements for a large site at the neighboring town of Torrance, the new industrial community started by the Union Tool Company, and will shortly remove its plant to that place. A practically new plant will be installed, with a complete outfit of the most modern machinery for the fabrication of structural steel, etc. The company now has several large structural con-

tracts, in addition to an order for 33 boilers for oil pumping stations.

The Star Drilling Machine Company has secured building permits for the construction of three large corrugated iron shop buildings at Long Beach, Cal.

The Schaw-Batcher Company, which has for about 20 years conducted a riveted pipe and boiler plant and wholesale hardware business at Sacramento, Cal., has secured a site at South San Francisco, and will begin construction at once on a new shop of considerably larger capacity than that at Sacramento. Four steel frame corrugated iron buildings will be erected, and the plant will be newly equipped throughout with modern machinery, which is now being ordered in the East. The move is made partly for the sake of ocean shipping rates on the large tonnage of steel now handled, and partly because much of the present business originates in San Francisco. This company had the largest steel pipe contract on the Portland, Ore., waterworks, and has just closed a contract for the Pacific Gas & Electric penstock, about 4500 tons, the heaviest sections to be of 1¼-in. plates. The new machinery will be able to handle plates up to 1½ in. The wholesale hardware and steel business at Sacramento will be continued.

The Progressive Mfg. Company, Stockton, Cal., has been incorporated with a capital stock of $25,000 by J. E. Funk, T. A. King and E. A. Sylvester, for the purpose of manufacturing ditching machinery and implements.

The city of Pasadena, Cal., is planning to install a new electric generating unit with an engine of the Diesel type.

The Pacific Coast Bakers' Machinery Company, San Francisco, has been incorporated with a capital stock of $10,000 by R. H. and A. T. Carey, E. W. and M. A. Brown and Edward Strauss.

According to a report from Los Angeles, the Macomber Motors Company will install a large plant at that place for the manufacture of automobile, aeroplane and motor boat engines.

It is reported that the Humboldt Valley Sugar Company, Lovelock, Nev., recently incorporated, will shortly install a sugar mill at that place.

The Greenwater Copper Company, operating near Indio, Cal., is installing a 100-ton stamp mill and a pumping plant.

Canada

WINNIPEG, MAN., October 18, 1912.

The demand for machinery in Western Canada keeps up even better than was expected a week or two ago. The prosperity of the country and the stimulus that business has received from the assurance of a large crop of good quality seems to have given a new lease of life to fall and winter industrial activity. Several new manufacturing concerns have been announced in the week in different parts of the West, and prospects are very favorable for considerable activity in machinery. The local houses are doing a satisfactory volume of trade, although a great amount of the machinery for new plants comes from either the East or South.

Plans have been prepared for a ten-story store and office building in Edmonton, Alberta, for Albert Cleland of that city. The cost is estimated at $400,000.

A. B. Stewart, formerly of Glasgow, Scotland, is reported to have decided to establish in Edmonton, Alberta, a plant to manufacture concrete-filled steel posts for carrying street car trolley, electric light and telegraph wires.

H. G. Struchen, St. Paul, Minn., representing a United States company, is negotiating with the Board of Trade of Prince Albert, Sask., to establish there a pulp factory.

The Arnett Furniture Company, Souris, Man., is preparing to double the capacity of its plant by adding more machinery.

The Boyd Syndicate, New York, is reported negotiating with the Industrial League of Saskatoon, Sask., to erect a large flour mill there.

The Pratt Food Company will erect a cereal plant at Saskatoon, Sask.

The Houghton Machinery Company will erect a manufacturing plant at Saskatoon, Sask., next spring.

A clay products company, with a capital stock of $250,000, and of which W. J. Douglas, of Toronto, is the head, has signed an agreement to erect a large plant at Tofield, Alberta. It will manufacture brick, fireproofing, etc.

Work has started on the construction of the Tofield Foundry & Machine Company's plant at Tofield, Alberta.

The Gordon Ironside & Fares Company, Ltd., pork packers, Winnipeg, will enlarge its cold storage plant at Fort William.

The Galloway Mfg. Company, Waterloo, Ont., has secured a site in Norwood, Man., across the river from Winnipeg, on which to erect an implement manufacturing plant.

The Redcliff Rolling Mills & Bolt Company, Ltd., Medicine Hat, Alberta, has been organized with a capital stock of $250,000, to establish a plant at Redcliff.

The Co-operative Laundry Company, Regina, Sask., will erect a steam laundry at Watrous, Sask., to cost about $30,000.

The Canadian Western Lumber Company, Ltd., a MacKenzie & Mann concern, is starting to erect a large sawmill at Comox, B. C. It will cost about $100,000.

A. C. Von Hagen, president of the United Flour Mills, Minneapolis, Minn., who is erecting a flour mill at Moose Jaw, Sask., is also negotiating to erect a mill at Vancouver, B. C.

The plant of the Redcliff Clay Products Company, Redcliff, Alberta, was recently damaged by an explosion. The loss is placed at $12,000 ,and considerable machinery will have to be replaced.

Victor Donaldson, Brandon, Manitoba, is the representative of an English company that is arranging to erect a boot and shoe factory at that place. The building will cost about $45,000, and the machinery about $22,000.

The Portage Hide & Tannery Company will establish a tannery at Portage la Prairie, Man. Otto Jensen is the head of the concern.

The Peace River Trading & Land Company will establish a flour mill at Grand Prairie, Alberta.

The George White & Sons Company, Ltd., London, Ont., manufacturer of farm implements and gasoline engines, is negotiating with the City Council of Moose Jaw, Sask., to erect a branch factory there.

The rolled oats mill of the Maple Leaf Milling Company, Ltd., Brandon, Manitoba, is to be enlarged from the present capacity of 575 barrels to 700 barrels.

N. M. Patterson & Co., grain dealers, Winnipeg, are erecting a 100,000 bushel elevator at Fort William. Hegland & Star, of Minneapolis, have the contract.

The Standard Steel Construction Company, Ltd., Welland, Ont., recently organized with a nominal capitalization of $200,000, has started the construction of a temporary building, 60 x 260 ft., to be used for the fabrication of steel and to have a capacity of about 500 tons per month. Both Canadian and American capital is invested in the company, and it has no connection with any other fabricating concern. It will buy the usual line of compressors, punches, shears, etc., purchase being made in Canada wherever possible. The company has 38 acres of land lying between the Welland Canal and Grand Trunk and Wabash railroads. Its capital will be increased and it will fabricate the steel for its permanent plant as soon as conditions warrant.

The Thor Iron Works, Ltd., Toronto, recently incorporated with a capital stock of $100,000, has purchased the plant and equipment of the Toronto Ship Yards Company. The machinery of the plant is modern and electrically operated by separate motors. The company will manufacture steel plate work of all descriptions; tanks, standpipes, water towers, flumes, penstocks, blast furnaces and structural steel for buildings, bridges, etc., and will also execute marine repair work.

The Electrical Utilities Company, Ltd., Toronto, recently organized with a capital stock of $40,000, has its new factory buildings at New Hamburg, Ont., nearly ready for occupation. The plant will comprise a brass foundry, iron foundry, machine shop, electro-plating and woodworking departments. A full equipment of machinery will be installed. The company will manufacture a complete line of telephones and accessories, small motors, fans and electrical appliances. James Fowler is president and R. F. Smith secretary.

The Canadian Malleable Iron Company, Ltd., Owen Sound, Ont., recently incorporated with $150,000 capital stock, is having plans prepared for the erection of a plant to contain two buildings, 80 x 500 ft. each, at Georgian Bay and the Canadian Pacific Railroad. The company is now making purchases of equipment.

Government Purchases

WASHINGTON, D. C., October 21, 1912.

The Paymaster General, Navy Department, Washington, will open bids under schedule 4883, class 23, for one double back-geared engine lathe for delivery to Portsmouth, and under schedule 4895, class 131, one high-duty engine lathe for delivery to Annapolis.

The Bureau of Yards and Docks, Navy Department, Washington, will open bids November 2 for additional power plant appurtenances, including one automatically controlled pump with receiver and necessary valves, one closed water heater and one oil separator.

The War Department, United States engineer office, Montgomery, Ala., will open bids November 15 for gate maneuvering gear, lock gates and filling and emptying valves.

The Department of the Interior, United States Reclamation Service, Washington, D. C., will open bids November 21 for furnishing operating machinery, gates, gate valves and other appurtenances for the Lahontan dam, Truckee, Carson project, Nev.

The Bureau of Yards and Docks, Navy Department, Washington, opened bids October 15 for materials and supplies for the Navy Yards as follows:

Schedule 4820, class 1, four electrically driven centrifugal pumps for delivery to Pearl Harbor, Hawaii,—Bidder 2, Alberger Pump & Condenser Company, New York, $4812; 40, D'Olier Centrifugal Pump & Machine Company, Philadelphia, Pa., $4977; 41, De Laval Steam Turbine Company, Trenton, N. J., $4000; 107, National Electric Supply Company, Washington, D. C., $2560 part; 118, M. C. Ricketts, Washington, D. C., $4756.85.

Schedule 4844, class 25, one receiver and pump for delivery to Newport—Bidder 3, F. A. Rumery, Portland, Me., $117.19; 11, T. T. Borchfield Company, Philadelphia, Pa., $226; 17, Blake & Knowles Steam Pump Company, New York, $120; 18, Buffalo Steam Pump Company, Buffalo, N. Y., $115; 51, Fairbanks, Morse & Co., New York, $114.50; 102, Manning, Maxwell & Moore, New York, $150; 139, Union Steam Pump Company, Battle Creek, Mich., $140; 163, M. T. Davidson & Co., Brooklyn, N. Y., $250.

Trade Publications

Refuse Destructor.—Hughes & Stirling, London, England, Griscom-Russell Company, 90 West street, New York City, American representative. Pamphlet. Calls attention to the Stirling refuse destructor that in general design embodies the continuous grate principle, the material to be destroyed being fed to drying hearths behind the grates from which it is dragged forward by stokers as fast as it dries. The general features of the destructor are briefly touched up and a typical plant arrangement is shown.

Drill Chucks.—Whalstrom Tool Company, 346 Carroll street, Brooklyn, N. Y. Pamphlet. Deals with an automatic self-closing drill chuck which is constructed along a new line. One of the special features of the chuck is the increasing of its capacity by the use of spacer blocks between the cam surfaces controlling the movement of the gripping members and the gripping members themselves. An illustrated description of this chuck appeared in *The Iron Age*, October 10, 1912.

Superheaters.—Power Specialty Company, 111 Broadway, New York City. Pamphlet. Gives general description and specifications for the Foster superheater. The construction of this superheater is described at length, the text being supplemented by halftone engravings. There are a number of views of installations and several test curves showing the advantages of superheating are reproduced.

Liquid Fuel Furnaces.—W. N. Best, 11 Broadway, New York City. Catalogue. Lists a number of different types of liquid fuel furnaces for forging, flue welding, bolt heading, rivet making and heat treating steel. All of these are illustrated and briefly described with condensed specification tables. Mention is also made of the various types of burners furnished, the different pumps used to supply the fuel and a line of portable furnaces. Instructions on the use of these appliances and a partial list of users are included.

Vacuum Apparatus.—Buffalo Foundry & Machine Company, Buffalo, N. Y. Brochure. Illustrates and describes a line of vacuum apparatus which embodies in its construction many novel and original ideas. These include dryers of the drum, shelf and rotary types as well as vacuum drying and impregnating apparatus, surface and barometric condensers and vertical and horizontal dry vacuum pumps for direct-connected and belt drives. A number of tables of useful information and a brief description of the testing laboratory maintained by this company are included.

Foundry Accessories.—Ph. Bonvillain & E. Ronceray, 9-11 Rue des Envierges, Paris, France. Two pamphlets, printed in French. One of these is bulletin 62, catalogue No. 6, and covers sand-mixing and sand-grinding machines, a rotary sand dryer, riddles operated mechanically by electricity or compressed air and elevating apparatus. The other is bulletin 63 of catalogue No. 6, and like the other bulletin shows numerous styles of equipment, many not at all common in this country. Among other apparatus is a small cupola particularly suitable for conducting tests of different mixtures of iron. It will be impossible to enumerate all the apparatus and equipment covered as the bulletin comprises over 70 pages, generously illustrated.

R. P. Lamont, president American Steel Foundries, issued a statement last week to the effect that the long shutdown of the Sharon works of his company, at Sharon, Pa., has been due to labor troubles. The molders employed there resisted the introduction of molding machines which are in use in all of the company's other plants, and he said that if the Sharon works is to be started again it will have to be with the understanding, in advance, that the molders allow such machines to be installed.

Steel "Dumping" in the Tin Plate Trade

A British View of Recent Changes Among Welsh Manufacturers

Before the recent meeting of the British Association, J. H. Jones, lecturer in economics at Glasgow University, read a paper on "Dumping as It Affects the Steel and Tin Plate Industries of South Wales." He stated that in the present century the relations of the steel and tin plate industries of South Wales have fundamentally changed under the pressure of foreign competition. Before the dumping commenced, tin plate manufacturers never went to the expense of installing Siemens or Bessemer plant; they always bought their bars.

During the iron trade crisis of 1907 and later, Belgians, Germans and Americans all dumped bars in South Wales. They sold at prices 7s. 6d. to 15s. per ton below those ruling for the home-made article, and were at first readily taken up at prices 10s. less than the home price. But they proved in reality less desirable than they seemed, even to purchasers. Foreign bars had to be purchased at buyers' risk, and paid for on delivery. They were not suited for makers of odd sizes, and small orders received no notice, since the dumper would send bars only by the shipload, at first, to be sold by London agents and later to order. Quality always varied, and at first was very bad. Thickness was not constant; the bars were more difficult to manipulate in the mills, and broke machinery. The quality of Siemens bars is now improved, but purchasers of tin plates still stipulate for tin plates made from English bars. Another fault of the dumped bars, he said, is that delivery cannot be guaranteed and they are welcomed mainly by those makers who confine themselves to a few standard sizes of inferior tin plates.

The results of the dumping are now apparent. The Welsh bar manufacturers who used to be unwilling to supply bars except in large quantities and standard sizes, now willingly supply bars of all sizes and quantities required. Other good results are few. Dumping makes the whole industry more unstable. It produces violent and unforeseen fluctuations in the market, and increases the difficulty of contracting for future delivery. It has produce a change of political feeling in South Wales. Tin plate manufacturers who at the time of the Tariff Commission inquiry were free traders are now becoming tariff reformers, because they are acquiring an interest in the making of steel billets. This uniting or integration of the steel and tin plate industries is a result of dumping.

In 1905 American dumping ceased for a time, and during the respite the Siemens Bar Association was formed in South Wales to stabilize prices, though not to restrict output. Its effort to regulate the price of bars was successful till 1907, when the foreign bars again appeared. Then, to preserve their markets, the Welsh bar makers acquired interests in the local tin plate works. Most tin plate manufacturers have now an interest in a steel mill. The position at present is that, though the Bar Association appears successful and its regulation of prices is observed, steel manufacturers are competing in the next stage as tin plate makers. Since so many firms are in the tin plate market and prices have not yet been regulated, the control of tin plate prices is the next step, and is likely to receive consideration in the near future. The lesson of the whole business, the speaker considered, was that the dumping pursued by protectionist countries might and does hurry on the formation of monopolistic combinations in the free trade country which is subjected to the dumping. He also held that from the dumping process makers and consumers benefit little.

New high records for September in both imports and exports of merchandise were made in the foreign commerce of the United States, according to figures announced by the division of statistics of the Bureau of Foreign and Domestic Commerce. September imports aggregated $144,862,343, against the former high record of $125,171,644 in September, 1911. The exports totaled $199,701,652, against the previous September high record of $195,798,647 in 1911. The excess of exports over imports was $54,839,309, against $70,627,003 in September 1911.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET

MEASURE OF DAMAGES FOR BREACH OF WARRANTY OF MACHINERY SOLD.—The measure of damages for breach of warranty as to the condition of second-hand machinery sold is not what it would cost to replace defective parts or to rebuild the machinery, but the difference between its actual value and the value it would have had if it had been as warranted, at the time of the sale. (St. Louis Court of Appeals, Hanna-Breckinridge Company vs. Holley-Matthews Mfg. Company, 140 Southwestern Reporter 923.)

TURNING LATHE AS EXEMPT PROPERTY.—A turning lathe owned by a machinist is exempt from seizure by his creditors, as a tool of his trade, if he is the head of a family. (Oklahoma Supreme Court, Smith vs. Roads, 119 Pacific Reporter 627.)

EFFECT OF LETTER ACCEPTING OFFER TO SELL.—In response to plaintiff's offer to sell 500 tons of scrap melting steel, defendant wrote: "In further reference to scrap, beg to state that we have decided to give you an order for sample car subject to our approval of the 500 tons mentioned sometime ago. The order is given on condition that you can make immediate shipment of the sample car, for if the scrap does not prove satisfactory we will want to have time to investigate sources of supply elsewhere." Held that the letter constituted a contract to buy one carload of scrap, and not 500 tons. (Indiana Appellate Court, Cal. Hirsch & Sons Iron & Rail Company vs. Peru Steel Casting Company, 96 Northeastern Reporter 807.)

COMPUTATION OF DISPATCH MONEY UNDER SHIPPING CONTRACT.—A charter party for transportation of a cargo of iron required that the cargo be loaded "at the rate of 250 tons per working day of 24 consecutive hours, Sundays and holidays excepted;" that loading and discharging time count from 6 a. m., Sundays and holidays and time between 1 p. m. Saturdays and 7 a. m. Mondays not count as lay days, and that dispatch money should be allowed "for every day saved, excluding forward Sundays and legal holidays." Held that, in computing dispatch money for days saved, fractions as well as whole days should be counted, and that unused Saturdays should be counted as 7 hours only and Mondays as 23 hours. (United States District Court, Eastern District of Pennsylvania, Fargrove Navigation Company vs. Lavino & Co., 191 Federal Reporter 525.)

INFRINGEMENT OF PATENTS.—Infringement of a patent cannot be excused on the ground that the device was to be put to a use not contemplated by the patentee. (United States Circuit Court, District of Massachusetts, General Electric Company vs. Condit Electrical Mfg. Company, 191 Federal Reporter 511.)

RATIFICATION OF UNAUTHORIZED PAYMENT TO SALESMAN.—Unauthorized payment of the price by a buyer to the seller's salesman is ratified by the seller attempting to enforce payment from the salesman. In such case, to preserve the right to proceed against the buyer, the authorized payment must be promptly repudiated on notice thereof. (Onondaga, New York, County Court, Goldstein vs. Tank, 132 New York Supplement 466.)

WAIVER OF SELLER'S DELAY IN MAKING DELIVERY.—One who has agreed to buy machinery to be manufactured by the seller waives the latter's delay beyond the time fixed by the contract for delivery, as ground for rescinding the contract, by leading the seller to believe up to the time of completion of the machine that it will be accepted notwithstanding the delay. (New York Supreme Court, Appellate Term, George A. Ohl & Co. vs. Henry L. Lewin Company, 132 New York Supplement 385.)

SUFFICIENCY OF NOTICE OF RESALE ON BUYER'S BREACH.—Defendants ordered a carload of spikes f. o. b. Marianna, Florida, and plaintiff accepted the order, subject to "cash against demand draft, bill of lading attached, payable upon presentation any time after shipment in New York or Chicago exchange." Plaintiff requested immediate telegraphic advice if the terms were not satisfactory, and, failing to receive objection, made the shipment. Defendants refused to receive the shipment or to pay the draft, requesting 2 per cent. discount for cash or 30 days credit. Plaintiff refused to modify the terms and, several days later, on being advised that defendants would not accept delivery unless their 60 or 90 day note should be taken, wired them that unless the draft should be accepted the same day other disposition of the car would be made and that it would be reforwarded. Held, that plaintiff sufficiently notified defendants of its intent to resell, to charge them with damages for breach of their agreement to buy. (Florida Supreme Court, Illinois Steel Company vs. Pennington & Evans, 56 Southern Reporter 687.)

PROVISION OF SAFE APPLIANCES AS DEFENSE TO EMPLOYER'S LIABILITY.—An employer is not liable for injury to a workman, caused by his failure to use safe appliances provided and prosecution of the work in an unsafe way, though under direction of a foreman. (New York Supreme Court, Second Appellate Division, Wells vs. Westinghouse, Church, Kerr & Co., 132 New York Supplement 224.)

SCOPE OF NEW YORK LABOR LAW.—The provision of the New York labor law which requires employers to guard dangerous machinery extends only to such accidents as may reasonably be expected. (New York Supreme Court, Third Appellate Division, Campbell vs. Kertscher & Co., 132 New York Supplement 178.)

CONTRIBUTORY NEGLIGENCE OF INJURED EMPLOYEE.—An employee injured through fall of an iron plate from a frame which he was painting cannot recover therefor from his employers, if he remained at work without protest while other employees, acting under a foreman's directions but in his absence, removed the bolts which held the frame together. (Pennsylvania Supreme Court, Sterner vs. S. Morgan Smith Company, 81 Atlantic Reporter 889.)

RIGHT OF FOUNDRY LABORER TO RECOVER FOR INJURY.—An employee injured while removing slag from the cupola room of a foundry, caused by the falling of brick piled too high, can recover for the damages sustained by him, a foreman having superintended the piling of the brick. The amount of $11,000 was not excessive recovery for the injury, the accident having permanently incapacitated plaintiff for ordinary labor, and he being 47 years old and having earned $500 a year before the accident. (Wisconsin Supreme Court, Scieczinski vs. Filer & Stowell Company, 133 Northwestern Reporter 641.)

EFFECT OF AGREEMENT TO SELL PLANT'S PRODUCT.—Agreement to sell the product of a manufacturing plant for a given term does not bind the seller to operate the plant throughout that term. (United States Circuit Court of Appeals, Fifth Circuit, H. M. Pfann & Co. vs. J. C. Turner Cypress Lumber Company, 194 Federal Reporter 69.)

CONTRACT VOID FOR WANT OF MUTUALITY.—A sales or a sales agency contract is unenforceable by a manufacturer if it does not bind him to sell, and leaves it optional with him to terminate the contract without making any delivery under it; mutuality of obligation being a fundamental essential to a valid contract. (United States Circuit Court of Appeals, Seventh Circuit, Velie Motor Car Company vs. Kopmeier Motor Car Company, 194 Federal Reporter 324.)

MANUFACTURER'S RESPONSIBILITY TO ULTIMATE PURCHASER.—A manufacturer of a machine is liable for injury to one who purchased it from an intermediate dealer, if the injury was caused by a defect in construction of which the manufacturer knew or should have known. (United States Circuit Court, Northern District of New York, Johnson vs. Cadillac Motor Car Company, 194 Federal Reporter 497.)

CONTRACTS REQUIRING SHIPMENT "AT ONCE."—A seller's agreement to ship machinery "at once" does not require immediate shipment, but merely requires him to use reasonable expedition to make delivery as early as possible. (Georgia Court of Appeals, Georgia Agricultural Works vs. Price, 74 Southeastern Reporter 718.)

MECHANICAL EQUIVALENTS IN PATENT INFRINGEMENT CASES.—Though a machine which operates continuously may be deemed the equivalent of one which operates intermittently, as affecting a question of patent infringement, the difference in the mode of operation, when the machines are complex, is very strong evidence that there is such a difference in them as will avoid infringement. (United States Circuit Court of Appeals, Eighth Circuit, American Steel & Wire Company vs. Denning Wire & Fence Company, 194 Federal Reporter 117.)

RIGHT TO RESCIND PATENT ASSIGNMENT.—An inventor of a device is entitled to rescind an assignment of his patents made under an agreement for payment of royalties, on the assignee failing to use the invention, as required by the contract. (United States Circuit Court of Appeals, Second Circuit, Neenan vs. Otis Elevator Company, 194 Federal Reporter 414.)

MONOPOLY AS DEFENSE TO PATENT INFRINGEMENT SUIT.—It is no defense to suit for infringing a patent that plaintiff is a member of an illegal combination in restraint of trade. (United States District Court, District of Massachusetts, Fraser vs. Duffey, 196 Federal Reporter 900.)

INJURY CAUSED BY DEFECTIVE HOIST.—An employer is liable for injury to a workman resulting from hoisting apparatus being negligently put together under a foreman's direction; the injured workman having nothing to do with construction of the apparatus and not knowing of its unsafe condition. (Kansas Supreme Court, Henry vs. Kaw Boiler Works, 125 Pacific Reporter 67.)

New Tools and Appliances

This is essentially a news department for which information is invited.

Oblique Universal Vise.—The Sellew Machine Tool Company, Pawtucket, R. I., has recently developed a vise for use in shaping and drilling machines, etc., which can be adjusted for the work held in it. Two oblique disks which are graduated on their peripheries so that direct vernier readings of angles can be obtained for the tilting adjustment as well as the radial readings for the adjustment around the vertical axis are the special features of the design. There is another set of graduations under the vise proper to enable it to be set about the axis regardless of the tilted position it may be in. This combination of a tilting and radial adjustment enables compound angles to be cut easily. The use of the oblique disk enables the vise to be supported at all times by a connection of solid metal between it and the base and at the same time gives a wide angular range without unreasonable hight.

Bench Filing Machine.—Edge & Edwards, 34 North Eleventh street, Newark, N. J., have brought out a bench filing machine in which the table is pivoted on both sides in a line with its center. This construction enables the table to be adjusted to any desired angle by two thumb screws. The file holder, which has a reciprocating motion, passes through a hole in the center of the table and slides in two bearings spaced 5 in. apart. The upper bearing has a bronze bushing and can be adjusted for wear, while it is protected by a cap carried by a file holder that entirely covers it.

Revolution Counter—A new type of revolution counter which is shaped like a revolver and also resembles it in size has been brought out by the American Ever Ready Company, 304 Hudson street, New York City. The counting mechanism is started and stopped by the operation of the trigger instead of being controlled by the degree of pressure with which the spindle is held against a revolving shaft. The spindle is held against the shaft and revolves freely with it, but the counter remains at zero until the trigger is pulled, thus eliminating the chance for the counting to begin too soon or too late, and the counting continues as long as the trigger is held, but stops as soon as it is released. The figures located at the head of the counter can be easily seen and are quickly set to zero. The counting goes forward whether the shaft is turning right or left.

Bell Ringing Transformer.—For use in locations where a large number of bells have to be rung, the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., has placed on the market a new type of bell ringing transformer. In design it conforms closely to the company's type S distributing transformer, being light in weight, compact in size and fireproof. The coils and the magnetic circuit are vacuum dried and impregnated with a moisture-proof insulating compound, after which the complete unit is fitted into the case. In this way it is pointed out that there is no possibility of the bell ringing circuit coming in contact with the 110-volt supply wires. On open circuit the transformer will deliver either 8, 16 or 24 volts, its voltage when completely loaded being 16 volts.

Belt-Driven Surface Grinding Machine.—The Peerless Surface Machine Company, Newark, N. J., has recently brought out a line of belt-driven surface grinding machines which are built in both the vertical and horizontal types. A rigid foundation is secured by coring out the solid base and the bearings have boxes of the sliding type, which, together with ample length, enable the stretch in the belt to be taken care of. It is possible to swing the table to any desired angle, and this in combination with the swivel stop enables any desired arrangement of angles to be obtained. The machine is fitted with a cast-iron dust collector which has an exhaust fan and catches all the metal dust as it is removed. The belts, which are made in widths ranging from 4 to 14 in., according to the size of the machine, are of the endless type and are covered with various abrasives to suit the different classes of work handled.

Switch Box.—The D. & W. Fuse Company, Providence, R. I., has recently designed a combination switch and fuse box for 250-volt direct-current circuits. After the fuses are installed the box may be locked and it is possible to open the circuit either by moving the lever at the side of the box or by opening the cover. The latter feature makes it impossible for fuses to be inserted in the circuit when the switch is closed. The lever at the side of the box can also be employed to close the circuit if desired. Rubber gaskets are provided for the boxes and removable porcelain bushings facilitate the installation.

Electric Grinding Machine.—The Chicago Pneumatic Tool Company, 1014 Fisher Building, Chicago, Ill., has designed and built a portable electric precision grinding machine, which is adapted for a large variety of both external and internal work. The frame is milled convex on its lower surface and is adjustable on a concave shoe to bring the center of the grinding wheel arbor in line with the center of the work. This shoe rests on the tool post base when the machine is applied to a lathe, having a swing of from 16 to 42 in. and is clamped to it by a bolt and nut. The arbor for external grinding carries a 5-in. wheel and has a split-sleeve bearing adjustable for wear. The heads of the cap screws fastening the straps which hold the arbor sleeve to the frame extend only a slight distance beyond the arbor housing itself and this permits the emery wheel to be worn down to a small diameter and yet give sufficient clearance for the lathe tailstock. The arbors can be changed quickly by removing the cap screws of the strap holding the arbor sleeve to the frame. The driving motor, which can be wound for either direct or alternating current for use on single, two or three-phase systems, is mounted on a hinge pin that enables it to be swung back to tighten the belt.

Cap-Screw Drilling Machine.—The tool construction department of the H. H. Franklin Mfg. Company, Syracuse, N. Y., has recently brought out an automatic cap-screw drilling machine in which one man can do the work of four. It is a continuously operating machine which drills three cap screws simultaneously and automatically ejects them, its capacity being 2000 pieces per day. The turret holds five cap screws and there are three drills operating simultaneously, each drilling a hole through one cap screw. After the holes are finished and the drills back out, the turret is revolved by a cam motion, and each screw is turned so that when it arrives at the next drill a hole is drilled through another side. As the turret revolves, an automatic spring plunger ejects the finished cap screw. The drilling head is also fed by a cam which engages a horizontal spring plunger having a rack cut on the front end that meshes with a pinion connecting with the spindle quill. A guide at the back of the turret holds the cap screws in place while being drilled.

Multiple-Spindle Drilling Machine.—For drilling the holes in ball bearing cages, and for similar work where as many as 14 holes have to be drilled simultaneously, the Taylor & Fenn Company, Hartford, Conn., has brought out a new type of drilling machine. This machine is equipped with a cluster head, the spindles of which are not adjustable, a different cluster being required for each combination of holes. The sleeve and cases are made in one piece into which is fitted a separate ring carrying the cluster spindles, and rings having different spindle combinations can be used with the same cases. These clusters are built with from 2 to 14 spindles, which are gear driven. To secure the required speeds the gear ratios are varied for the different sizes of drills used.

Two-Spindle Drilling Lathe.—The F. E. Wells & Son Company, Greenfield, Mass., has recently designed two types of two-spindle drilling lathes which are intended for work where two holes are to be drilled or counterbored on opposite sides of the same piece. Three-step cone pulleys drive the spindles which are traversed by yokes and levers connected through chains to a foot treadle which actuates them simultaneously. When the pressure on the treadle is released the spindles are pulled back by coiled springs. The spindles have a threaded nose reamed to conform to the No. 2 Morse taper, and, if desired, draw-in collets are furnished. Instead of a three-step cone driving pulley a two-step cone pulley with back gears can be substituted. The construction of the machines is practically identical, but in one the spindles are permanently in line with each other, while in the other the head at the right end is mounted on a cross slide which permits it to be set over as far as 6 in. if desired.